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Discourse of De-escalating Arousal: How Couples Interact during Problem-solving Discussions when Heart Rate is Decreasing

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Discourse of De-escalating Arousal: How Couples Interact during Problem-solving Discussions when Heart Rate is Decreasing

by

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Dedication

To the many couples who want their relationships to work well.

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Discourse of De-escalating Arousal: How Couples Interact during Problem-solving Discussions when Heart Rate is Decreasing

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Couples with high levels of aversive physiological arousal during marital conflict risk becoming divorced (Gottman, 1994). This study examined the features of discourse characterizing episodes of decreasing heart rate. Twelve married couples engaged in a fifteen-minute videotaped marital problem-solving discussion while wearing a heart rate monitor. Their IBI data were used to identify 120 episodes of decreasing heart rate of at least five-seconds duration, and 120 comparable episodes of increasing heart rate. All videotaped episodes were coded for both husband's and wife's behaviors, and t-tests were conducted to compare features during increasing versus decreasing heart rate.

The characteristic features of discourse during decreasing heart rate were: speaking with certainty, and being open to another perspective. Features that occurred significantly less often during both husband's and wife's decreasing heart rates were: eye gaze, head nods, deep breaths, self-adaptors, and illustrative gestures. Features that occurred less often only during husbands' decreasing heart rate were humor, acknowledgement tokens, and responding neutrally to wife's negative remark. Humor occurred more often during increasing heart rate that was followed immediately by decreasing heart rate.

A discourse analysis of two exemplar episodes revealed that decreasing heart rate was demonstrated by gentleness, certainty, and openness to another perspective. Increasing heart rate was characterized by the cautious use of language and illustrative gestures, by self-adaptors, and by careful listening behavior, including acknowledgement tokens.

An understanding of discourse features characterizing changes in heart rate is a first step toward enabling people to manage their own physiological arousal during problem-solving discussions, and to support their partners' arousal management.

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CHAPTER 1: INTRODUCTION AND REVIEW OF LITERATURE

A married couple's ability to manage negative physiological arousal during conflict predicts the future of their relationship. Couples who are able to reduce their heart rates during conflict are more likely to stay married than are couples whose heart rates increase and remain high during problem-solving discussions (Gottman, 1994). Since communication between marital partners is both an essential part of relating and a prime source of arousal (Arnette, 1997; Levenson & Gottman, 1983; Notarius & Markman, 1993), helping each other reduce aversive arousal during marital communication, and especially during conflict, is an important relational skill. This study seeks to discover the identifying features of the discourse of married couples when their heart rates are decreasing.

PHYSIOLOGICAL AROUSAL DURING MARITAL INTERACTIONS

Researchers have long been interested in the construct of escalating physiological arousal (e.g., Allen, Hunter & Donohue, 1989; Beatty, 1984; James, 1894; Schacter & Singer, 1962), but little research explicitly addresses how couples DE-ESCALATE or REDUCE arousal during marital conflict (but see Gottman, 1999; Gottman, Coan, Carrere, & Swanson, 1998). This chapter defines the process and problematic nature of aversive physiological arousal, and discusses models of marital interaction which implicate arousal as a problem during marital conflict.

Aversive Physiological Arousal

Arousal is **physiological activation elicited by the perception of a need for action.** This definition embodies the salient concepts of arousal used by researchers in psychophysiology (e.g., Cacioppo & Tassinary, 1990, pp. 802, 804; Johnson & Anderson, 1990, p. 217). Some kinds of physiological arousal are enjoyable (e.g., sexual arousal, euphoria), but during interpersonal conflict, arousal is generally experienced as unpleasant or aversive (Arnette, 1997; Levenson, Carstenson & Gottman, 1994), especially at higher levels (Gottman, et al., 1998). This aversive physiological arousal is the focus of this study.

Arousal is an extremely complex physiological process in which the body prepares for action. It involves the interaction of many body systems (e.g., cardiovascular, autonomic, neuroendocrine, electrodermal, skeletomotor), as well as behavioral and relational factors (Cacioppo & Tassinary, 1990; Gunnar & Donzella, 1999). These body systems are activated, regulated, and interact with each other in a delicate and complicated manner, in which one system may be down-regulating while another is increasing activation, so that their responses do not correlate neatly. Researchers do not fully understand how this is orchestrated, but the consequence is that no particular physiological measure is always the "best" index of stress or arousal (Gunnar & Donzella, 1999; Johnson & Anderson, 1990). The unified stress response anticipated by Cannon (1963) does not exist. Instead, the psychobiological perspective suggests that each body system serves different functions in meeting stressors, with the needs of the body as a whole

regulating how energy is distributed to each system. When the stress is over, the body returns to homeostasis (Gunnar & Donzella, 1999).

The key to measuring arousal is to select a body system that is responsive to the elements of interest in one's research. Since this study's focus is on learning about communication during reducing arousal, it is important to measure arousal with an index that responds rapidly to both internal (e.g., changes in arousal level) and external (e.g., social interaction) stimuli (Doussard-Roosevelt & Porges, 1999). The cardiovascular system is a logical choice, since it maintains its basic function continuously, yet responds almost instantly when confronted with a stressor (Johnson & Anderson, 1990; Papillo & Shapiro, 1990). The frequency of the heart beat, commonly measured by interbeat interval (IBI) (milliseconds between successive R-spikes of the heart's electrical pattern) or by heart rate (an average of the number of heart beats per minute) is a good indicator of this response (Doussard-Roosevelt & Porges, 1999; Gottman, 1994; Johnson & Anderson, 1990). In addition, measurement of IBI/heart rate can accomplished non-invasively and reliably, and instruments for this purpose are readily available (Hugdahl, 1995). Thus, cardiac response is a logical measure of choice for this study. Its role in the process of arousal is described next.

When arousal first begins, a brief orienting response may catch a person's attention and cause the heart rate to decrease briefly while the person focuses intently on the perceived stressor (Stern, Ray & Quigley, 2001). This happens most often when the stressor is novel and/or unpredictable. Following the orienting phase (if present), the autonomic nervous system (ANS) reacts to the

perceived stressor(s) by almost instantaneously increasing heart rate and blood pressure (Doussard-Roosevelt & Porges, 1999; Guyton, 1991; Johnson & Anderson, 1990; Rowell, 1986; also see Gottman, 1994 and Matsumoto, Walker, Walker & Hughes, 1990 for extended discussions of arousal). This heart rate response is orchestrated by the parasympathetic nervous system (PNS), one of the two major subsystems of the ANS, and is regulated by the vagal nerve fibers that originate in the nucleus ambiguus portion of the brain stem. The vagal response initially helps to mobilize metabolic output (including increased heart rate) to support "attentional engagement, emotional expression, and/or communication," and promotes "incremental changes in heart rate" for "regulated emotional responses" (Doussard-Roosevelt & Porges, 1999, p. 59). If arousal is interrupted at this point (i.e., you realize that you do not need to act or react), recovery is rapid.

If arousal is not interrupted, the sympathetic nervous system (SNS), the other major subsystem of the ANS, initiates production of stress-related hormones in order to prepare a person for action. As the preparation for action begins, the vagal nerve fibers that emerge from the spinal sympathetic system are activated to support the massive changes in heart rate needed for this response (Doussard-Roosevelt & Porges, 1999). The SNS activates more slowly than does the PNS, but the effects of SNS activation last much longer.

As the physiological activation of arousal increases, cognition plummets. People who are acutely aroused cannot reason clearly (Berkowitz, 1993, 1994) or process information normally (Bradbury & Fincham, 1987; Zillmann, 1990,

1994). Cognition narrows to an acute interest in the perceived crisis (Zillmann, 1990, 1994) and people lose their ability to problem solve (Sabourin, 1996) or to perform newly-acquired communication skills such as those provided in therapy or other training programs (Gottman, 1999). Increases in arousal are accompanied by "relative increases in the intensity of responding" (Cacioppo & Tassinary, 1990, p. 802; see also Zillmann, 1994). These changes in behavior typically begin with increased attention to the stressor and are accompanied with modulations of facial expression, breathing, and vocalizations (Doussard-Roosevelt & Porges, 1999). They may escalate into unplanned aggression (Berkowitz, 1993, 1994; Buss, 1961; Sabourin, 1996). In personal relationships, the aroused person may need to interact in courteous and creative ways in order to simultaneously maintain the relationship and meet his/her individual goals, but the cognitive ability necessary for such interactions is impaired by high arousal (Zillmann, 1990). This is key to the need for couples to reduce arousal periodically during conflict.

Recovery from arousal is not nearly as rapid a process as is becoming aroused. During high arousal, the body is inundated with stress-related chemicals (Rowell, 1986). Even after the stress ceases and the emergency is resolved on a rational level, it takes at least twenty minutes (Gottman, 1994) and sometimes much longer (Zillmann, 1990) before body chemistry returns to pre-emergency levels and a person's cognitions, as well as arousal level, return to baseline. If new stressors occur before the body has recovered (a frequent occurrence in

distressed relationships), the new state of arousal builds upon the existing (high) level of arousal (Zillmann, 1994). Arousal escalates.

Intense physical action would allow the body to discharge arousal and return to baseline conditions or homeostasis (Cannon, 1963; Zillmann, 1990). However, such action is not always desirable or appropriate in interpersonal interactions. In a marital conflict, for example, vigorous physical actions such as hitting, kicking, or screaming may exacerbate the problem. At such times, the body's magnificent ability to meet stress becomes a stressor itself.

Summary of arousal

To summarize, arousal is a normal process in which the body prepares to meet a perceived emergency with action. Arousal is nearly instantaneous, allowing rapid response to a crisis situation. The cost of such an immediate response is a decrease in cognitive functioning. In interpersonal crises, such cognitive deficits may impel a person toward vigorous action even when such a response is interpersonally inappropriate. Reducing physiological arousal is necessary in order to permit a person to regain cognitive function and choose their preferred manner of interacting.

Models Implicating Aversive Arousal in Marital Interaction

A growing body of research demonstrates that physiological arousal is a problem in interpersonal interaction, especially in the context of marriage (e.g., Bradbury & Fincham, 1987; Gottman, et al., 1998; Miller, Dopp, Myers, Stevens, & Fahey, 1999; Notarius & Markman, 1993; Warner, 1996). This section discusses two models of marital interaction in which arousal is a key component.

The first, by Fruzzetti and Jacobson (1990), uses arousal level as the key factor accounting for the likelihood that marital conflicts will or will not be resolved successfully. The second, by Gottman (1994; 1999), includes arousal and soothing (reducing physiological arousal) as factors critical to marital stability.

Fruzzetti and Jacobson's negative escalation model

Fruzzetti and Jacobson's (1990) model contrasts conflict interactions among highly physiologically aroused people versus interactions in which participants' arousal was low or moderate. In their model, a person who begins with low or moderate physiological arousal tends to focus on the problem to be resolved, and discussion is sustained until joint resolution is achieved. Upon successful resolution of the problem, any negative arousal decreases quickly and the person (and couple) builds a history of success in conflict. The arousing properties of conflict decline for those individuals and the next conflict situation seems less threatening.

A person who enters a conflict situation with a high arousal level has far less likelihood of success. When a highly (or chronically) aroused person engages in conflict, s/he may be unable to endure the increase in arousal that tends to accompany conflict, so s/he may not be able to continue the discussion for a long enough time to attain problem resolution. Instead, aversive arousal, unsuccessful attempts to manage the arousal, unsuccessful resolution, and heightened arousal create a vicious cycle. Negative experiences bleed into the person's (and couple's) history, and the next conflict will probably be approached as an aversive, arousing event. This, in turn, increases the likelihood of yet

another negative experience. Perhaps because of such negative experiences, some highly aroused people withdraw from conflict when they sense painful increases in their own arousal. Unfortunately, this does not facilitate successful joint problem resolution. Fruzzetti and Jacobson do not address how couples may reduce arousal in order to enter conflict with a better chance of success, although it is apparent that this is needed.

Gottman's triad of balance

Gottman's model (1994) suggests that physiological responses interact with behavioral and cognitive factors to create a "core triad of balance" which predicts marital stability. The elements in this triad are:

1) Physiological responses, conceptualized as a dynamic balance between diffuse physiological arousal and reduction in arousal, or "soothing." This balance is tempered by cardiac reactivity, an individual trait-like variable.

2) Behavioral factors, the balance of positive/negative behaviors in the interaction.

3) Cognitive factors, the person's overall perception of relationship quality.

Physiological, behavioral, and cognitive factors affect each other. When any one element – arousal, interaction, or the perception of the relationship -- becomes negative, people may become "flooded" or overwhelmed with negativity. They attribute stable and global negative qualities to the relationship, and distance and isolate themselves from their spouses by communication behaviors such as complaining/criticizing, defensiveness, contempt, and

stonewalling. If the negative cycle is not broken, couples re-cast their marriages in negative terms and many eventually separate or divorce.

Happy, stable marriages work through "a model of gentleness, soothing, and de-escalation of negativity," in which the "physiological soothing of the male either by his partner or himself" (Gottman et al., 1998, p. 17) predicts positive outcomes for the marriage. Couples who fail to reduce the husband's arousal are less likely to be happy and stable. Similar trends are found for the wife's arousal. Gottman (1999, p. 82) notes that "people need to be able to soothe self and partner at the very level of physiology." His research supports the importance of couples' communication in reducing aversive physiological arousal in marriage.

CHAPTER 2: THE PRESENT INVESTIGATION

Aversive physiological arousal is a problem in marital interaction, especially during conflict (Alberts, 1990; Gottman, et al., 1998; Kiecolt-Glaser, Fisher, Ogrocki, Stout, Speicher & Glaser, 1987). Couples need to manage arousal (Gottman, 1999) so that its negative individual (e.g., health) and relational (e.g., divorce) consequences (e.g., Burman & Margolin, 1992; Gottman, 1994) can be reduced. It would be useful to know what sorts of communication indicate when arousal is decreasing. This present investigation seeks to contribute an understanding of the features of discourse that characterize talk when physiological arousal (as measured by heart rate) is decreasing during a marital problem-solving discussion.

The literature describes some features of discourse which are known to occur during decreasing heart rate. These will be discussed under the categories of content and nonverbal communication.

CONTENT FEATURES OF DECREASING HEART RATE:

The four content-related features listed here come from a data set in which 130 newlywed couples discussed marital problems while being videotaped and monitored physiologically (Gottman et al., 1998). It is curious to note that each feature was statistically significant only when considering the husband's heart rate. No content features that have been tested thus far have proven significant to wives' decreasing heart rate.

Humor

Humor is soothing, when the "funniness" is shared by both partners. Gottman et al. (1998) found that husbands' heart rates decreased when wives used humor. Humor is defined as any behavior (e.g., facial expression, comment, action) that both partners think is funny, and that has "an underlying tone of happiness." Humor is "shared between two individuals" and ranges from joking and good-natured teasing to laughing, giggling, private jokes, nonsensical speech, fun, or exaggeration, as well as recognizing absurdity, wit, and we-against-other laughter (Gottman, McCoy, Coan & Collier, 1996, p. SPAFF-142).

Acknowledgement Tokens

Backchanneling or offering acknowledgement tokens reduced the heart rate of husbands who performed them (Gottman et al., 1998). Such validation included eye contact, as well as "head nods, 'Umm-hmms,' or other physical and vocal assenting behaviors that indicate that the person is listening in an affirmative fashion" (Gottman, 1994, p. 299).

Neutral Reply to a Negative Remark

Responding to a negative remark with a neutral comment reduced the heart rate of the husband offering the neutral response (Gottman et al., 1998). In the study described above, newlywed husbands who de-escalated negative affect (i.e., responded neutrally to negativity) during the conflict experienced decreased heart rates.

Expressing Affection

Expressing affection (verbally and/or visually) to their wives assisted husbands in reducing their own heart rate during marital disagreements (Gottman et al., 1998). The decreased heart rate was significantly more likely for husbands in couples who were happy and stable six years later.

NONVERBAL COMMUNICATION FEATURES OF DECREASING HEART RATE

The features listed below were not tested in the context of marital communication, but literature relating discourse features to decreasing heart rate is sparse, so they will be used as possible indicators of what may occur during marital problem-solving.

Silence

Ceasing speaking decreased the ex-speaker's heart rate and blood pressures (Gerin, Pieper, Levy & Pickering, 1992; Lynch, 1985; Lynch, Thomas, Long, Malinow, Chickadonz & Katcher, 1980; Tardy, Thompson & Allen, 1989). Gerin et al. (1992) tested 40 female students in an interactive situation with three "peers" (confederates), while heart rate and blood pressures were monitored. Heart rate and systolic blood pressure were significantly lower during times when the women were silent.

Lynch et al. (1980) reported three experiments testing the effects of speaking on heart rate and blood pressures. First, six female graduate students were each instructed to talk to their small seminar class for two minutes about anything they wished, then to remain quiet for two minutes. Both heart rate and blood pressures were significantly lower during the silent period. Second, ten

students were each interviewed alone and asked to talk for "a couple of minutes" before being quiet for two minutes. Again, heart rate and blood pressures were lower during the quiet period. Finally, ten male and ten female students each read out loud, talked about themselves to an experimenter, listened to the experimenter discuss concepts of blood pressure, talked about their feelings, and were silent. Quiet periods were inserted between tasks. Heart rate and blood pressures during the quiet periods (including the last silent period) were lower than during any of the verbal activities.

Tardy, Thompson and Allen (1989) asked 20 female and 18 male students to alternate speaking and resting periods. Their speaking consisted of selecting a topic from a list and talking about it for one minute. They found that all talking periods had higher heart rate, compared with all silent periods.

Prosody

A slower rate of speaking related to decreased arousal in the speaker (Siegman, Dembroski & Crump, 1992). In this study, 24 female students read four stories at different rates of speed: habitual for them, fast, moderate, and slow. Their heart rate and blood pressure readings were assessed at 1-minute intervals. Slow speaking related to significantly lower heart rate and blood pressures when compared with fast speaking.

Softer speech (decreased speech amplitude) also related to decreased arousal (Siegman et al., 1992). As a part of the study above, a different group of 24 female students read four stories at varying amplitudes: habitual for them,

soft, moderate, and loud. Softer speech related to significantly lower heart rate and blood pressures when compared with habitual loudness.

Combining slow/soft speech also related to decreased heart rate (Siegman et al., 1992). Forty male students participated in structured interviews while undergoing periodic measurement of heart rate and blood pressures. One-third of the way into the interview, the men were instructed to begin speaking either fast and loud, or slow and soft. Two-thirds of the way into the interview, the opposite condition (fast-loud or slow-soft) was required. Participants' heart rates and systolic blood pressures were significantly lower in the slow-soft condition than in either their habitual speaking style or in the fast-loud condition.

Touch

Touch (pulse palpation) reduced heart rate (Lynch, et al., 1980; Nilsen & Vrana, 1998), but social touching can increase heart rate (Nilsen & Vrana, 1998). Lynch et al. (1980) had ten male and ten female students undergo a series of tasks (see above). During one quiet period, pulse palpation was used. Heart rate during pulse palpation was significantly lower than during any other period. Nilsen & Vrana (1998) manipulated touch for 61 male and 64 female students. Professional touching (i.e., pulse palpation) decreased heart rate and blood pressure, especially if the toucher was a female. However, unexplained social touching created initial increases in heart rate and blood pressures, especially if the toucher was a male.

SUMMARY OF DISCOURSE FEATURES OF DECREASING HEART RATE

Research using physiological measures indicated several features that were associated with decreasing heart rate. For husbands, these included: humor, responding to negativity with neutrality, expressing affection for one's spouse, and providing acknowledgement that one is listening. For men and women who were not tested as couples, ceasing speaking, or speaking slowly and/or softly, and sometimes touch were associated with decreasing arousal.

FOCUS ON PHYSIOLOGICAL DE-ESCALATION

Two caveats should be noted here. First, this study focuses on physiological change (i.e., decreased heart rate) rather than on subjects' reported feelings. Feeling soothed may accompany reduced physiological arousal (see Levenson, Carstensen & Gottman, 1994; Lewis & Ramsay, 1999), but the empirical investigation of this issue is not the focus of this study. Second, behaviors which facilitate reduced arousal do not necessarily imply a conscious intention to reduce arousal. People often do things "naturally" without conscious intent or awareness of the implications of their actions (Planalp, 1999; Wegner & Bargh, 1998; Wood & Kroger, 2000). This is likely to be the case when physiological arousal (an unseen, sometimes unconscious process) is an integral part of the equation.

RESEARCH QUESTION

Fruzzetti and Jacobson's (1990) and Gottman's (1994, 1998) models suggest that physiological arousal has negative effects on marital communication, especially during conflict. The features listed above suggest that particular

behaviors help to decrease heart rate. Furthermore the literature suggests that, while the individual may affect his/her own heart rate (e.g., through speaking slowly), his/her conversational partner's behavior (e.g., wives' humor, another person's touch) also influences his/her heart rate. This is especially relevant in the context of marital communication, in which couple's behaviors (and physiology?) are likely to be relationally influenced (Caughlin & Vangelisti, 2000).

Relatively little is known about what couples do and/or say that relates to decreasing physiological arousal during marital problem-solving discussions. The framing question for this study is: What features of discourse characterize episodes of decreasing heart rate during marital problem-solving discussions?

CHAPTER 3: METHOD

PARTICIPANTS

Data were obtained from fifteen heterosexual married couples in western Washington State. Heterosexual couples were chosen because of possible gender differences in arousal and soothing (e.g., Gottman, 1994). Married couples were selected because they are likely to have topics that engender physiological arousal when they disagree (e.g., Gottman, 1994; Notarius & Markman, 1993). Permission to use human subjects was obtained from The University of Texas at Austin before the study was conducted.

Couples were recruited using a newspaper article about the study, flyers posted in public places (e.g., the post office, the local community college), announcements in the researcher's college class, and by word of mouth. Participating couples were required to be: married, English-speaking, not taking medications known to affect arousal, not under a doctor's care for high blood pressure or any known cardiovascular problems, and with the wife aged 45 years or younger (to avoid possible interactions between heart rate patterns and menopause). Several couples who were willing to participate did not meet one or more of the criteria and were not included in the sample for this study.

The couples who actually participated in the study were recruited in the following ways: Two couples contacted the researcher as a result of fliers posted at the local community college. Three couples responded to a local newspaper article requesting participants. Two couples came because one member was a

student in the researcher's Interpersonal Communication class and wished to receive extra credit points, while two more couples came in order to gain extra credit points for relatives in the class. Six couples learned about the need for participants during personal conversations with the researcher.

In order to increase motivation to participate in the study, each participating couple was given John M. Gottman and Nan Silver's (1999) book: The seven principles for making marriage work. In addition, each couple was entered into a drawing upon completion of the experiment, and the winners of the drawing were awarded a dinner for two at the restaurant of their choice. All participants were assured of confidentiality, given the opportunity to withdraw at any point in the study, and were thanked for their participation in the study.

Data from twelve couples are used in the analyses reported in this study. Of the fifteen couples who participated, two couples (D005C and D009C) had to be excluded from analyses because one or both partners did not have adequate physiological data at the end of the lab session. One couple (D011C) had ingested caffeine prior to coming to the lab, so their data were excluded from analysis as a precaution (Lassner, Matthews & Stoney, 1994).

Participant characteristics for the twelve couples who comprised the final sample are as follows: Ages of husbands ranged from 19 to 50 years, with an average age of 32.17 (SD = 9.65). Ages of wives ranged from 19 to 45 years, with an average age of 30.25 (SD = 9.27). More than 95% of the participants were Caucasian (n = 23), while one wife was Thai. Nine husbands and ten wives were on their first marriage, one husband and one couple indicated that this was their

second marriage (the latter couple had married each other twice, with no other marital partners), and one couple reported that this was the third marriage for each of them. Marriage lengths for the current marriage ranged from one month to 25 years and three months, with an average marriage length of 6.50 years (SD = 9.08). Couples had from zero to four children, with zero to two children living at home. The average number of children was 1.33 (SD = 1.16).

Socioeconomic status of participants included white collar workers (i.e., certified public accountant, teacher, physical therapist) (n = 9) blue collar workers (i.e., city equipment operator, espresso stand worker, warehouse worker) (n = 9), homemakers (n = 4), and full-time students (n = 2). Educational backgrounds included some high school (n = 1), high school degree or equivalent (n = 4), some college (n = 10), college degree (n = 6), and graduate degree (n = 3).

PROCEDURES

Overview of the Lab Visit

This section provides a brief overview of the lab visit, which was based on that used in Gottman's (1994) studies of marital interaction. After initial screening, each couple made an appointment to come into the lab. Upon arriving, they viewed the lab, completed consent forms (see Appendix A) and filled out questionnaires (see Appendix B). A heart monitor was applied to each person. The couple were seated in chairs half-facing each other and asked to relax with their eyes closed for 5-10 minutes to establish initial baseline heart rates. Videotaping began at this time.

After the closed-eye baseline, each person completed a form listing areas of disagreement (Gottman & Krokoff, 1996, see Appendix B). The researcher facilitated the selection of several "hot" discussion topics relevant to current issues reported in the couple's relationship and encouraged the couple to use their discussion time productively together. Another 2-3 minute pre-interaction baseline period followed, in which the couple relaxed with open eyes. Then the couple engaged in a 15-minute discussion period while the researcher and lab assistant waited outside.

When the discussion time was over, the heart monitors were removed. The researcher answered any questions the couple had about the experiment and, when appropriate, used a portion of the Oral History interview (Gottman, 1994) to re-focus the couple's attention on the positive aspects of their relationship. The couple was given the book about marriage and entered into the drawing for a dinner for two. Finally, they were thanked for their time and participation.

Research assistant

One male undergraduate research assistant assisted with data collection. He attended the first lab session as an observer, and the researcher explained the purposes of the investigation, demonstrated how the equipment operated, and explained the research protocol. For the other fourteen sessions, the research assistant helped the researcher set-up and take-down the lab, and facilitated equipment testing and trouble-shooting. In addition, he applied the transmitter belt to most of the male participants, and assisted in equipment hookup as needed. During the facilitation phase, he double-checked videocamera and other

equipment function. After the discussion was over, he helped ensure that data collection was complete, and helped prepare the lab for the next session.

Data Collection Procedures

Experimental procedures were performed as follows:

Recruitment and screening (before lab session)

After recruitment and screening, as described above, eligible couples were scheduled for the lab visit. They were asked to not smoke, ingest caffeine or alcohol, eat a heavy meal, or exercise strenuously for at least three hours prior to the lab session (Lassner, Matthews, & Stoney, 1994).

Lab setup (before lab session)

Three lab locations were used, depending on availability. Two were classrooms at the local community college, and one was a classroom at a local church. All three rooms had similar carpet and wall coloration (pinkish multi-colored carpet and off-white walls), and all three contained some furniture extraneous to the experiment (e.g., tables, chairs, cabinets). All rooms had doors that afforded privacy during the experiment, and window coverings were used in order to protect this privacy.

A stage setting was created for the experiment by setting two chairs in half-facing positions in front of a wall or screen draped with gray fabric. The gray background permitted better distinctions of facial features and expressions on camera than were possible with a bright wall in the background. Microphones and the two sets of receiving devices were placed on the chairs prior to the couple's arrival. The computers (3 laptop and 1 full-size personal computer) and

other recording equipment (two off-white notebook-sized boxes) were placed close to the walls at either side and/or behind the couple. Another small table with a black box displaying continuous IBI data faced the main videocamera about 6-8 feet in front of the stage area. Three videocameras were used – one in the center focusing on the couple and the IBI display box, one on one side focusing on one spouse, and one on the other side focusing on the other spouse.

Six systems interacted to create the lab. See Appendix C for a description of system components. A visual depiction of each system was used as a checklist to determine that each system was prepared for use before the couple arrived. A computer and electronics specialist was available for consultation when needed.

Consent form and questionnaires (about 10 minutes)

When the couple arrived at the lab, they were welcomed and shown around the lab. Then they were invited to sit at a table near the door. The researcher briefly explained the experimental procedures and answered any questions, then asked them to read and sign the consent form (see Appendix A). Each person had one consent form to sign, then traded forms with their partner in order that all signatures appeared on each form. One completed form was given to the participants at the close of the lab session, while the other form went into the researcher's files. After completing the consent forms, each person completed the Current State Questionnaire, Demographic Data, and the Marital Opinions Questionnaire (see Appendix B).

Equipment hookup (up to 10 minutes)

After questionnaires were completed and any questions about current states resolved, Polar (Polar Electro Oy Company) heart rate transmitter belts were placed around the chest of each person. This entailed checking the approximate size needed for the belt and adjusting its band accordingly, spraying water on the sensor areas of the belt, and applying the belt to the skin of the chest. The female researcher assisted all female and some male participants in belt application and placement. The male research assistant helped some male participants in this procedure. Depending on the clothes that the females were wearing, the belts were applied in the lab or in a nearby restroom.

The couple was invited to move to the stage setting, and were seated in assigned chairs. Chair selection was counterbalanced by gender between sessions. Microphones, the Polar receiver, and the Thought Dynamics (Thought Dynamics Company) receiver were attached. Data collection was initiated on all of the computers, and adjustments were made as necessary to enhance signal strength. Water glasses and a pitcher of ice water were placed on the stage floor between the chairs for easy access. All videocameras were adjusted and turned on.

Resting baseline (5-10 minutes) (Videotaped)

When all systems appeared to be working, the couple was instructed to close their eyes and relax quietly for five to ten minutes. This resting (closed-eyes, no talking) baseline was intended to determine the couple's initial baseline heart rates for use in future studies. The Polar software program's Alternate-I

function was used at the beginning of the resting baseline, and the researcher coordinated this function with the research assistant verbally so that it was also recorded on the videotapes. After pressing Alternate-I, the researcher and assistant exited the room for the baseline period. At the end of the time period, they knocked on the door and returned, immediately using Alternate-I again to indicate the end of the resting baseline. The Sony videocamera was then turned off to conserve the short (30 minutes) tape.

Facilitation (10-60 minutes) (Videotaped with Cameras #2 and #3)

Couples were asked to complete the Knox Problem Inventory (Gottman & Krokoff, 1996; Knox, 1971), using clipboards while remaining in their stage chairs. When the forms were completed, the researcher examined the responses and selected several areas of current disagreement that might be discussed. Following the procedures used in the Gottman lab (see Hooven, Rushe & Gottman, 1996 for a complete description of the facilitation interview), the researcher asked each person in turn about the proposed topic of disagreement, probing for that person's perception of the facts about the topic and feelings associated with that topic. The goal of the facilitation was to help both individuals have a solid place from which to start the discussion of the chosen topics, and a recognition of their points of difference, while not making either person appear "wrong" or foolish.

Before beginning the facilitation, the researcher informed the participants that they could refuse to discuss any topic that made them uncomfortable. No couples refused to discuss a topic during the facilitation, but several couples

expressed reservations about using particular topics during the discussion. "If we discussed that, we couldn't drive home together," commented one wife about the topic of money. Such preferences were honored. After several possible topics had been examined, the couples helped choose which topic(s) they would like to discuss.

The researcher framed the discussion as a constructive experience, offering the couple an opportunity to discuss topics of importance and value for their relationship. The couple was encouraged to try to make some progress on one topic at a time, and only move to the next topic if time permitted. Any cell phones or radios were turned off in preparation for the discussion period.

Pre-interaction baseline (3-4 minutes) (Videotaped)

The main videocamera was turned on again. The couple sat silently for approximately three minutes with open eyes, but no eye contact, for the pre-interaction physiological baseline. During this time the researcher completed paperwork and checked on equipment. Alternate-I was used immediately before and after this baseline. Microphones were turned on at the conclusion of this period.

Conflict discussion session (15-20 minutes) (Videotaped)

Alternate-I was used to mark the beginning of the discussion period. The researcher and lab assistant left the room and monitored the discussion on the TV screen outside. Volume was turned off, and the couple knew the researcher was not listening to their discussion at that time. At the end of fifteen minutes, the researcher knocked on the door and she and the lab assistant re-entered the room.

Alternate-I was used to indicate the close of the discussion. The main videocamera was usually turned off at this point, while the other videocameras were allowed to run until it was convenient to stop them.

Equipment removal (about 5 minutes)

Participants were unhooked from the two receivers and microphone, and the transmitter belts were removed.

Debrief and focus on the positive (5-15 minutes)

The couple was invited to comment and ask questions regarding the experiment. Oral History interview questions (Buehlman & Gottman; 1996) such as how they met, what first attracted them to each other, and what they recall of their courtship and wedding were used to help the couple process any residual negativity resulting from their discussion (Gottman, 1994). The couple was given Gottman and Silver's (1999) book, and the researcher highlighted some of the interesting findings of Gottman's research. The couple completed a contact sheet with their address and phone number, and the name and address of someone who would be able to reach them if they moved. The researcher answered any further questions, thanked the couple for their time, and escorted them to the door.

Clean-up and preparation for next lab session (30-60 minutes)

After the couple left, the researcher and lab assistant finalized data collection and prepared the lab for the next couple. Tasks essential to this role included: remove and label each videotape, clean Polar transmitter belts with alcohol, save data files on the computers, save and close Polar and Telix programs on the computers, return television to the lab room, turn off microphones and all

receiving units, turn off computers and videocameras, return the borrowed videocameras and tripods, unwind cables and place Polar and Thought Dynamics monitors and microphones on stage chairs, prepare questionnaires on clipboards at entry table, etc.

When it was necessary for the lab to move between lab sessions, the entire lab was dismantled and packed into the researcher's vehicle. In such cases, two to three hours were needed to set up the lab for the next session.

Follow-up with participants

After all of the data were collected, the researcher placed all of the couple numbers in a heart-shaped bowl, and her youngest daughter drew out the number for the drawing (Couple #D010C). The researcher arranged to pay for a dinner for two at the restaurant of their choice. The researcher also sent every participating couple a thank you letter expressing her appreciation for their participation.

Data Management

Questionnaires and other written data were filed in manila file folders designated for the couple or the individual (i.e., "D004C Lab Notes," "D004C Husband," or "D004C Wife"). These files were taken to the researcher's home office and placed in a file used exclusively for this study.

Videotapes were stored in the researchers' home office. The videotapes of the couple (created on the main videocamera) were copied from their Mini-DV original tapes to VHS tapes. These copies showed the closed-eye baseline, open-eye baseline, and discussion. In addition, the discussion sections of all of the

couple's videotapes were placed sequentially on discussion-only videotapes for repeated viewing.

MEASURES

Cardiac Interbeat Interval (IBI)

Transmitter belt

Cardiac data was collected by the Polar T-61 Coded Transmitter (Polar Electro Oy Company), a lightweight wireless transmitter belt that participants wore around their chests. The Polar transmitter belt continuously monitored the electrical activity of the heart and signaled each heart beat. Polar heart monitors are being used in a variety of research labs today (e.g., Biddle & Armstrong, 1992; Miller, Dopp, Myers, Stevens, & Fahey, 1999; Tulppo, Makikallio, Seppanen, Airaksinen & Huikuri, 1998) because they are comparable to electrocardiogram and Holter monitoring devices in accuracy (Laukkanen & Virtanen, 1998), are easy to apply, and are relatively comfortable for participants to wear for an extended period of time (J. Doussard-Roosevelt, personal communication by email, August 22, 2000; G. E. Miller, personal communication, May 2, 2000). Piloting confirmed that the Polar transmitter belt was less invasive to apply and much less irritating to wear than cup or tab-type electronic sensors.

Corresponding receiving systems

Because psychophysiology laboratories are renowned for being problematic in data collection, two separate but corresponding receiving systems

were used for each participant in this study to receive data from the Polar transmitter belts. The first receiving system, comprising the Polar Advantage receivers, was recommended by Polar for this research study (through multiple telephone conversations with Matt Rivas of Polar USA, 2001) and is available commercially. The Polar Advantage receivers were connected to computers running the Polar Precision Performance 2.1 software, which collected IBI data in a "*.hrm" file for analysis. The Polar system (and most other commercial systems researched) has no means of displaying real-time data on the videoscreen as the couple converses. As a consequence, the accuracy of linking a participant's IBI data with his/her videotaped behavior depends on identifying the precise time that the Alternate-I key was used during data collection. The Alternate-I key demarcates the beginning and ending of particular segments of data (e.g., beginning and ending of baseline periods, or of the discussion).

The second receiving system, custom designed by Thought Dynamics (designer: Don Crumley, Shelton, Washington) for this research application, included a small (i.e., one cubic inch) receiver connected to both a receiving unit and to a computer running Telix (terminal emulation) software. Data were collected in a "*.txt" file for analysis. In addition, each participant's IBI was simultaneously relayed by cable to a display unit placed on a table between the camera and the couple to provide real-time data on the video screen as the couple interacted. For every heart period, the Thought Dynamics display indicated the hexadecimal number of that heart beat and the interbeat interval (IBI) associated with that heart beat. Thus a running indication of each consecutive heart beat and

its IBI for each participant was displayed continuously on the video screen during the couples' discussions.

Questionnaires

All questionnaires are included in Appendix B. Two questionnaires were designed for this study. The Current States Questionnaire was intended to identify activities which may interfere with cardiovascular measures such as smoking, drinking caffeinated or alcoholic beverages, eating a heavy meal, or exercising strenuously within three hours prior to the lab session (Lassner, Matthews & Stoney, 1994).

Demographic Data included basic questions about gender, age, and ethnicity, education, and socio-economic status as well as questions suggested by Karney and Bradbury (1995) regarding marriage and children. These data were used to describe sample characteristics in this study.

The Marital Opinions Questionnaire (Huston, McHale & Crouter, 1986) (*alpha* = ._; *r* between first eight items and final item = ._) was used to measure participants' assessments of their marriage. This measure was selected because it provides a global assessment of participants' feelings of satisfaction in their marital relationship, but does not include communication behaviors in the items rated.

The Knox Problem Inventory (Gottman & Krokoff, 1996; Knox, 1971) was used to help determine the areas of disagreement that a couple was currently experiencing (Gottman, 1994). This form was used to guide the facilitator in helping the couple select relevant topics for their discussion (Gottman, 1996).

Validity and Reliability

Issues central to the validity and reliability of the interaction and physiological data are discussed in this section.

Interaction data

The face validity of the interaction is high, since marital conversation is an "everyday" experience (Tracy, 1991). While the experience of conversing in the lab is unusual, people tend to habituate as they become involved in personally relevant conversations (Sillars, 1991), and data from their conversations predict real-world events (e.g., divorce) (Gottman, 1994; Gottman, et. al, 1998).

Physiological data

Heart rate is considered a valid measure of arousal and is commonly used for this purpose (Cacioppo & Tassinary, 1990; Hugdahl, 1995; Lewis & Ramsay, 1999; Papillo & Shapiro, 1990). The frequency of the heart beat reacts rapidly to stressors and reflects recovery from stressors as well (Doussard-Roosevelt & Porges, 1999; Gottman, 1994; Hugdahl, 1995; Johnson & Anderson, 1990; Papillo & Shapiro, 1990). In this study, the time between successive heart beats (IBI) was used to identify the episodes of decreasing arousal to be analyzed.

Researchers familiar with the Polar heart monitors consider them reliable tools for this type of study (J. Doussard-Roosevelt, personal communication by email, August 22, 2000; G. E. Miller, personal communication, May 2, 2000). The accuracy of the Polar monitor is similar to that of electrocardiograph machines, with correlations between measurements performed by ECG and Polar monitors ranging from 0.97 to 0.9979 (Laukkanen & Virtanen, 1998). The

interbeat interval (IBI) between the transmitted heart beats was calculated for each transmitted signal. IBI is measured in milliseconds and is a more direct measure than heart rate, because no averaging across multiple heart beats is required. IBI is the measure of cardiac function actually employed in this study, but because its description is counter-intuitive (when IBI goes "up," arousal is going "down"), the terminology "heart rate" will be used when discussing the changing length of heart periods in general terms.

PILOT TEST

In order to test the proposed methodology, a pilot study was conducted with five couples and two individuals participating. Data collection techniques differed slightly between couples, as aspects of the methodology and theory were varied slightly to see which worked best. A preliminary coding checklist was also tested with a group of coders, and results indicated that trained coders should be able to use a similar coding system with reasonable reliability. No escalating episodes were coded, and no statistical analyses were attempted with these data.

DATA ANALYSIS

This section describes the method used to analyze the data. It first discusses the selection and treatment of the data to be analyzed, then explains how the episodes of decreasing heart rate were coded, and notes how the episodes of increasing heart rate were coded. (Note: In the remainder of the paper, the person whose heart rate is changing is frequently referred to as the "focal person.")

Selecting the Data to Analyze

Corresponding receiving systems

As noted above, two separate but corresponding receiving systems were used in this study to receive data from the Polar transmitter belts. Due to small differences in clock units, the number of milliseconds attributed to each IBI varied slightly between systems. When graphs of the two data sources were compared with each other, however, the same trends were clearly visible in both.

Initial data preparation using Polar data as primary source

Upon initial inspection of the data, it was decided to use the data from the Polar receivers as the primary data source, and to use the corresponding data from the Thought Dynamics receivers to resolve any questions arising out of the Polar data. This decision was made because: a) more of the couples had complete computer files of the Polar data than of the Thought Dynamics data, and b) the Polar software (Polar Precision Performance 2.1) purchased with the Polar Advantage receivers could easily be used (with *.hrm files) to view the graphs of each individual's IBI's during the lab session.

The Polar software was used to edit out gross physiological errors from the files. Then the discussion graph and other graphs, including a listing of all of the IBI's, in order as they occurred, were printed. Originally, it was expected that analysis of the graphs would be the primary mode of discovering periods in which heart rate was decreasing (i.e., those in which the IBI graph's slope moves from shorter IBI's [faster heart rate] to longer IBI's [slower heart rate] during a period of at least five seconds). However, in working with the data, it quickly became

evident that hand-analysis of the graphs was both time-consuming and inaccurate, since trends with mild slopes were difficult to recognize and the precise length representing the minimum time period of five seconds differed between subjects on the Polar-generated graphs, creating a fruitful and unnecessary source of potential error.

Attempts were made to use Microsoft Excel or another program for trend analysis. Finally, Thought Dynamics created a custom program called IBI Trend.exe (see author to obtain copies of programs) to analyze each participant's IBI values for trends. The rules used for determining a trend were: all numbers must be in consecutive order (rising for decreasing heart rate trends, falling for increasing heart rate trends) and the total value of IBI's must be at least 5000 milliseconds (msec). The criterion requiring every succeeding number to rise (or fall) when compared with the previous number proved to be too stringent – some participants would have had no trends at all with this criterion. When the criterion was revised to allow single-value discrepancies in the trend (e.g., 690, 717, ***757***, 749, 752), and to allow identical values to be acceptable (i.e., 720 and 720 again) in a sequence, all participants had at least some trends. This seemed to be a reasonable choice, since single heartbeats in a sequence of several heart beats may be discrepant in order, but not prevent overall trend development. IBI Trend.exe was used with the edited Polar data for each participant to create lists of potential episodes of decreasing heart rate, as well as potential episodes of increasing heart rate.

Before the trend lists could be compared with the video, the times listed in the Polar graphs and the times used in the video date/time indicator had to be reconciled. The video time for each Alternate-I, as indexed by the researcher's voice, "Alt-I, ready, set, go, PUSH!" was recorded for each couple, along with the Thought Dynamics hexadecimal heartbeat number for each participant at that time. A custom program (PolarIBITime.exe) was written to take Polar's graph time for the appropriate Alternate-I, as recorded in the Polar records, and compare it with the video time as heard on the videotape at that Alternate-I. This comparison was used to calculate the video times for the beginning and end of each trend, based on where they occurred in the Polar data. This allowed the researcher to watch the video, while using the video date/time indicator to identify when trends were occurring. The Thought Dynamics hexadecimal heartbeat number could then serve as an additional referent and protection from gross error in identifying a particular trend.

The videotaped discussions were viewed with the lists of trends, and notations were made of the beginning words of each episode. Trends during which the focal person remained silent were excluded from the corpus of data because ceasing speaking can result in decreased heart rate (Gerin, et al., 1992; Lynch, et al., 1980). Similarly, trends of increasing heart rate in which gross physical movements (e.g., emphatic arm/hand gestures, large shifts in posture) were the apparent cause of the change in heart rate were identified and excluded from further analysis. The remaining trends were ranked according to their scores on absolute difference in IBI's, as calculated by the IBI Trend.exe program.

These scores identified trends with the greatest changes in heart rate. For each participant, the trends of decreasing heart rate with the greatest difference scores (i.e., the most profound change in heart rate) were chosen for analysis.

Change of primary data source

When the trends identified in the Polar data were ready to link to the videotaped behavior, Pinnacle's Studio DV program was used to capture the couples' discussions from the digital videocamera's Mini-DV tapes and transfer them into the computer. It was expected that the episodes of decreasing heart rate would then be titled and placed into clips, then copied back to VHS tapes for continued analysis. As the scenes were being captured, however, Studio DV seemed inconsistent in its capture of the requested frames. In order to resolve the perceived timing inconsistencies, the Thought Dynamics hexadecimal heartbeat counts were used to determine exactly where each trend should begin.

It was discovered that the slight inaccuracies in the linking of the Polar data and the video date/time codes were sometimes resulting in mismatches of one to two minutes between the beginning of the decreasing heart rate according to the calculated video time and the actual beginning of the decrease in heart rate, which was being displayed continuously and instantaneously on the Thought Dynamics' display unit. In a study in which milliseconds mattered, this was unacceptable. As a consequence, the decision was made to change to the primary use of the Thought Dynamics data. The Polar and Thought Dynamics data had already proven to be correspondent (based on comparing graphs), but the continuous display on the video itself allowed the Thought Dynamics data to be

reliably linked at any instant with the videotaped record in a way that was not possible with the Polar data.

Data preparation using Thought Dynamics data as primary source

Although the Thought Dynamics data had the vital advantage of being directly linked to the videotaped interaction, changing primary data sources required much additional preparation, as well as repetition of tasks formerly completed for the Polar data (i.e., identification of trends, watching the trends on the video, deleting trends as necessary for silence/movement).

The Telix computer software used to record the Thought Dynamics data on the computer during the lab session was not intuitive to use, with the result that many of the lab sessions produced incomplete computer files of the Thought Dynamics data for one or both partners. However, thirteen of the fifteen couples had Thought Dynamics data displayed on the videotape of their discussion (data from one of these couples was not analyzed because they had ingested caffeine prior to the lab visit). The videotapes were reviewed, and the IBI data were entered by hand for each participant whose data were missing in the computer files. This was facilitated by a custom computer program called Hexbuild.exe (Thought Dynamics) that allowed the entry of an initial hexadecimal value, and automatically incremented this value as each IBI value was entered. After a participant's data were entered, the video display and the newly-entered IBI data were compared again to ensure accuracy. Changes were made as necessary, to create an accurate *.log file (e.g., D004CHUS.log) for each participant, containing Thought Dynamics data for the discussion period. Both these raw data

and those of the computer-collected *.log files were then manually cleaned and edited, using the principles discussed by Berntson, Quigley, Jang, and Boysen (1990) to identify and correct physiological artifacts.

The edited .log files (e.g., eD04CHUS.log) were run through the IBI Trend.exe program to find trends of decreasing and increasing heart rate, using the same criteria as were described above for the Polar data. The identified trends were compared with the raw data, and any trends that incorporated editing changes that were not obvious in nature were deleted from the data set. The remaining trends were then viewed found on the videotapes (using the hexadecimal values on the display unit) and examined for silences (decreasing heart rate trends) or large movements (increasing heart rate trends).

The resulting trends of decreasing heart rate were ranked according to the degree of IBI change exhibited in that episode, with the greatest amount of change in IBI taking the top rank. The highest episodes were reviewed on the video to remove any episodes in which the focal person was silent throughout, as well as to identify those in which the person's response was extremely short. The top five remaining episodes were included in the data set for intensive analysis, and the next highest two episodes were employed for training. (The exception was D008C Wife, who only had five non-silent episodes of decreasing heart rate, one of which was a short answer. All five of these episodes were used for analysis.)

Coding the Episodes of Decreasing Heart Rate

Once the episodes of decreasing heart rate were identified, they were coded to learn what features of discourse were present. The steps in this process

included: becoming familiar with the data, creating tapes of episodes of decreasing heart rate and other episodes, refining the coding scheme and coding manual, training observers, and coding the episodes of decreasing heart rate.

Becoming familiar with the data

Immersion in the data (J. B. Bavelas, personal communication by email, October 22, 2000; Wood & Kroger, 2000) was the first step toward recognizing and understanding the features that would emerge later in analyses. Understanding the context of episodes by being familiar with the whole discussion was a logical place to start (Gottman, 1979), and this was accomplished by repeatedly watching the entire discussion of each couple. As the trend reports became available, the discussion was reviewed to learn which of the potential episodes might qualify as codable decreasing heart rate episodes (i.e., the focal person was not silent). Upon the change from Polar to Thought Dynamics data, this process was repeated with the new sets of trends. The time spent in identifying and transferring the context clips and codable episodes (both decreasing and increasing) from the camera to the computer and back to video format allowed still more opportunity to become familiar with the data, and contributed to an increased understanding of the couples' argument themes.

Creating a tape of codable episodes of decreasing heart rate

Adobe Premiere 6.0 was used to create a title and clip for each chosen episode. Adobe allowed precise, frame-by-frame selection of the beginning and ending of each episode. Title slides were created for each episode, listing the following information: focal person (wife or husband), couple number (e.g.,

D001C), type of episode (if escalating or training), and the beginning and ending hexadecimal heart rate values for that trend (e.g., A103 to A10B). Information about each trend used in the final analyses is included in Appendix D.

The episodes to be coded began with the heart beat number (hexadecimal) immediately before the heart beat at which the physiological trend began, and ended on the heart beat number immediately after the one at which the trend ended. This bracketing was intended to avoid truncating words or actions that were clearly a part of the codable episode, but were not understandable without the small amount of extra time. Behaviors were coded for the entire recorded episode.

In addition to the codable episodes, a context clip was placed between the title slide and the codable episode. Although the behaviors contained in this context clip were not coded directly (with the exception of "negative remark by spouse," "deep breath in the context clip," and "humor in the context clip"), adding the context permitted more understanding of the codable episode itself. When the spouse spoke within approximately twenty seconds of the beginning of the codable episode, the context clip began with the spouse's comment. When this was not practical, the context clip began with the statement that seemed to best capture the thought and tenor of the conversation close to the beginning of the episode. Context clips of twenty seconds or less were used whenever possible. The context clip was clearly demarcated from the codable episode by another screen that was either blank white (in early versions), or white with green letters saying "Please Code Now" (in later versions). The complete coding format

used on the videotapes was: title slide, context clip, white blank or white green-lettered screen, codable episode, blank screen.

Creating training and review tapes

In addition to the main tape of codable episodes of decreasing heart rate, two other tapes of episodes of decreasing heart rate were created: one for training, the other not including context clips. The training tape followed the same format (i.e., title, context clip, white screen, episode, white screen) as the tape of codable de-escalating episodes, but used lower ranking trends.

A tape of codable "just de-escalating episodes" was also created to aid in identification of patterns in the data. It was identical to the primary tape used for coding, except the context clips were not included.

Creating a coding scheme

No comprehensive coding scheme exists with which to code episodes of decreasing heart rate. An initial coding scheme (version 3 in the proposal, as shown in Appendix E) was developed that incorporated the features described in the literature as relating to decreasing heart rate. In addition, notes were made during the process of reviewing tapes and episodes, on features of the discourse which seemed interesting or which were common across multiple episodes.

The initial coding scheme was used as the basis for a second coding scheme (version 5) formulated to include these features as well as others suggested in the literature (but not tested with heart rate) that seemed in some way relevant to episodes of decreasing heart rate. Examples of these include self-adaptors, certainty, making lists, saying "you know." This coding scheme was

used to code several training episodes, and several of the new categories were deleted when found to be either not useful or extremely difficult to code. This process of reviewing episodes and refining the coding scheme and accompanying coding manual was repeated several times before a stable scheme was found that seemed to ask the most pertinent questions in a codable manner. Coding System Version 5 (see Appendix E) was used to code the episodes of decreasing heart rate.

Training observers

The training of the observers (the author and a second coder who has a graduate degree in another field) lasted approximately four hours. During training, observers reviewed the coding scheme and coding manual together, discussing the definition and background of each category. Observers then coded three training episodes from different couples. They discussed differences in their ratings and resolved these, revising the coding manual to help improve the clarity of the categories. Both observers viewed all of the discussion videos in order to gain an understanding of the general context for each couple's discussion.

Observers then independently rated seven additional episodes, rating both husband and wife in each episode. Percent agreement ranged from 67-100%.

Coding the episodes of decreasing heart rate

The author coded all 120 of the episodes of decreasing heart rate, rating both husband and wife for each episode (total n = 240 rated episodes) and transcribing the text of each episode as it was analyzed. The second coder separately rated 20% of the episodes, comprising one episode for each person in

the sample (n = 24 episodes, rating both husband and wife for a total n of 48 rated episodes of decreasing heart rate).

Data from the coding sheets were entered into Microsoft Excel and re-checked for accuracy. Interrater reliabilities for the episodes of decreasing heart rate were computed, and those episodes in which interrater reliability was an issue were reviewed and discussed by the observers. Differences were resolved and a collaborative coding sheet was created for each episode in question.

The coding manual was further refined in preparation for coding the episodes of increasing heart rate. In addition, all of the decreasing heart rate episodes were re-coded (based on the transcriptions made during initial coding) to create a separate category for "shake head" and to better reflect the developing understanding of the meanings of the categories "accept own responsibility in a relational problem," "explain something outside of the relationship," and "meta-talk about relationship." Final interrater reliability scores are listed in Table 1, with Rosenthal's (1982) correction applied.

Coding the Episodes of Increasing Heart Rate

Episodes of increasing heart rate were coded to help identify by contrast the features most relevant to decreasing heart rate. The steps in coding the escalating episodes included: creating the tape of episodes of increasing heart rate, revising the coding scheme and manual, and coding the episodes.

Creating a tape of episodes of increasing heart rate

A set of episodes of increasing heart rate was created for comparison with the episodes of decreasing heart rate. The two sets of episodes were matched by

participant, main speaker, and – as far as possible – time length. Episodes of increasing heart rate met the same criteria as did episodes of decreasing heart rate (see above), except that the slope of the graphs was the opposite (i.e., showing increasing arousal). The episodes with the greatest change in IBI were selected and reviewed on the video.

Increasing heart rate trends in which the focal person either moved substantially (e.g., major repositioning in the chair, or making large arm movements), or was silent were removed from further consideration. The five remaining trends with the highest IBI changes were then compared to the focal person's episodes of decreasing heart rate that had already been chosen. When possible, episodes were matched by length. Trends of increasing heart rate tended to be longer, so when a comparable match with fewer than 600 msec difference was not available, the most extreme end of the escalating episode was retained, and the episode's starting point was adjusted to create an episode of shorter length that better matched the decreasing heart rate episode's length. The context clips generally retained the beginning of the increase in heart rate, so the overall effect was not lost on the video, but the length of interaction to be coded was similar between the matched episodes.. The format on tape for the episodes of increasing heart rate followed that used earlier: title slide (this time marked "escalating"), context clip, white blank or green-lettered screen, codable episode of increasing heart rate, and blank white screen.

Revising the coding scheme

After all of the episodes of decreasing heart rate were coded, the researcher examined the frequencies for each item and revised the coding scheme. Features that rarely occurred were deleted, including: yawn, general gestures/movement, express affection for partner, and paraphrase spouse's words/meaning. One feature, shake head, was added to the coding scheme after having to be recoded in the decreasing heart rate episodes. Two features were modified slightly: "only my perspective" better captured the meaning of the category "offer own perspective," and eye contact was modified to create a single "eyes toward" category, rather than continuing to attempt to separately identify if a person was continuing eye contact, attempting new eye contact, or merely gazing in the direction of the spouse's face and eyes. Meta-talk was deleted because of continued poor reliability. Coding Scheme Version 6 (see Appendix E) was used to code the episodes of increasing heart rate.

Coding episodes of increasing heart rate

The episodes of increasing heart rate were coded, again assessing both participants' behaviors for each episode. Interrater reliabilities for the 20% of the episodes that were coded by both coders, had somewhat higher results than with the episodes of decreasing heart rate. Greater experience in using the coding scheme, and continued refinement of the coding manual probably contributed to the increase in interrater reliability. Interrater reliabilities for the episodes of increasing heart rate are listed in Table 1, employing the Rosenthal (1982) correction.

Comparing Features of Decreasing versus Increasing Heart Rate

Sums for each discourse feature were computed, as were means and standard deviations. The coding systems were calibrated so that each corresponding feature appeared on the same row in the data set. T-tests were conducted for each feature.

Table 1 Reliabilities for Coding Schemes

Coded Feature	Coding System 5 Rosenthal's		Coding System 6 Rosenthal's
Eye contact-continued	0.92	Eyes toward	1.00
Gaze at spouse	0.97		--
Eye contact-new	0.93		--
No eye gaze continued	0.96		0.98
Break eye contact	0.96		0.98
Other eye cues	0.99		0.82
Deep breath during context	-0.08		0.63
Deep breath-inhale	0.74		0.94
Deep breath-exhale	1.00		1.00
Yawn	1.00		--
Gesture/move-illustrative	1.00		0.98
Gesture/move-adaptive	0.84		0.99
Gesture/move-general	0.72		--
Gesture/move-repetitive	0.92		0.98
Head nod	1.00		0.94
Head shake	0.82		0.96
Other head cue	0.64		0.87
Touch partner	none		--
Touch self	1.00		0.94
Change in pitch	0.81		0.80
Stammering/stuttering	0.82		0.99
Slower speech rate/pauses	0.89		0.88
Quieter voice	0.93		0.74
Other vocal cue	none		none
Accept responsibility	0.80		0.81
Agree with spouse	0.92		0.96
Acknowledgement token	0.70		1.00
Ask new-info question	0.99		0.95
Change topic	1.00		0.82

Explain something	0.88	0.89
Express affection	none	--
Humor	0.81	1.00
Humor in context clip	0.88	0.82
Meta-talk about relationship	0.54	--
Paraphrase spouse	0.87	--
Conclusion	0.83	0.95
Certainty	0.89	0.81
Directive	none	1.00
Feeling words	1.00	0.92
List several items	1.00	0.88
Only my own perspective	0.95	1.00
Tentative language	0.95	0.99
“We” language	1.00	0.97
“You know”	0.89	1.00
Response to negative spouse	0.99	0.96

CHAPTER 4: RESULTS

The framing question for this study asked what features of discourse characterize episodes of decreasing heart rate during marital problem-solving discussions. The episodes were the unit of analysis. T-tests were conducted to determine what discourse features distinguished between episodes of decreasing versus increasing heart rates. All quantitative tests were two-tailed, with the alpha level set at .05. Because of the number of t-tests conducted, Bonferroni's correction was applied. As a result, a probability of 0.0125 or less was required to attain the .05 alpha level, and a probability of 0.0025 or less was required to attain significance at the .01 level. The attainment of the .05 or .01 alpha level is reported below, rather than the actual probabilities. Significant findings are summarized in Table 2.

COUPLES' DISCOURSE FEATURES DURING DECREASING HEART RATE

The first analyses treated each episode as a dyadic phenomenon, comparing coded features across episodes of decreasing heart rate in which the heart rate of either the husband or the wife (or both) could be changing, with features of episodes of increasing heart rate (by husband, wife, or both). The assumption was that changing heart rate might be associated with the actions of either person in the couple, or with their interaction. The results indicate that couples do behave differently during episodes of (anyone's) decreasing heart rate than they do during episodes of (anyone's) increasing heart rate. These

differences will be discussed using the categories of content and nonverbal communication features.

Content Features of Decreasing Heart Rate, by Couples

Certainty

Certainty occurred more often in episodes of decreasing heart rate (t [478] = 3.42; $p < .01$). Certainty was coded for episodes in which the speaker used words or tone of voice to display full confidence that what s/he was saying was absolutely correct and unquestionable.

Since certainty is not a common category in the literature, some examples of statements coded as certainty in this data set follow:

"[That's an issue] we really have to try to work out, especially lately" (1H-H-52E)

(Belligerent tone) "What about the time we took you out in the car – we went out in our car. You wouldn't even go in there with me. After the day of the wedding you wouldn't even go with me." (2H-H-151B)

(Defensive tone) [I didn't go with you] "one time when you had to drop off the quad, and she [mother-in-law] was out gardening anyways and I didn't want to get [child] out of the truck." (2W-W-1146)

"Well maybe you should start talking to her too" (Wife responds: "Well I have tried to talk to her, [name], I have") "No you haven't." (2H-H-154E)

"Well, and there's no way we could do it any other way. I mean, it would be the most stressful experience in the [world]" (4W-W-1202)

"It's not that I don't go to mediators, not that I don't, not I, I, I, don't, don't all that. That's not what it is." (6H-H-12CD)

"So if you wanted to hear what I'm about on it, that's what I'm about. If you want to say what you want to say to [your brother], that's up to you. You say what you want to say to [him]." (6H-H-12D4)

(Relaxed tone) "Recreational stuff … That's really isn't a big problem to me, you know what I mean, … I mean none of them are like real major problems." (7H-H-DA3)

"[I am freezing] so bad [name]. I'm so cold." (Husband responds, "You got goosebumps, too.") "Yeah, I'm cold." (7W-W-129F)

"You won't fail." (Wife: "I can't fail.") "We failed once and we're not going to do it again. We're here around family and friends now and we won't …" (12H-H-11FD)

(responding to accusation) "Really! Last night I was in bed before you got in." (12W-W-11BF)

"No, I know everybody that hangs out near [city] and they're not bad people." (Husband asks: "Do they judge you for what your father did?") "No, they don't." (13W-W-1C47)

"[We're upset at each other] about something I don't even care about and that makes me even more mad because we're fighting about something so stupid (pause) to me." (14H-H-16AC)

"Because you know what happened." (14H-H-18D6)

As these examples show, certainty was indexed by words like "even", "really", "everybody", and "especially" that conveyed strong opinions, as well as by tone of voice and use of vocal emphasis.

Only my own perspective

Talk that emphasized that the statements being made were "only my opinion" or might be true only "for me" were coded in this category, as were episodes in which a person offered his/her own perspective while implying that s/he realizes that the spouse may not agree with this perspective. "Only my own perspective" talk occurred more often during decreasing heart rate (t [478] = 3.47; $p < .01$) across the sample.

"[You] kind of have a desire to want to do something else, just for achievement (pause) do you feel? Or is there really something else?" (1W-W-222)

"And yet I mean, this is just my option." (4W-W-1214)

"I guess it would be something (pause) that you and I could figure out (pause) behind the scenes." (6W-W-CF2)

"Well I think we ought to …" (7W-H-1178)

"The China issue – from what I heard, there's a really good layout in there of her." (13W-H-1A5F)

"Well, I thought you'd go with me." (15H-H-1491)

Nonverbal Communication Features of Decreasing Heart Rate

Surprisingly, all of the nonverbal features of discourse that proved statistically significant occurred more often during increasing heart rate, rather than during decreasing heart rate. Eye gaze, breaking eye contact, head nodding, deep breaths, self-adaptors, and illustrative gestures were all less likely to occur during decreasing heart rate.

Eye gaze

Findings showed that eye gaze was used less during episodes of decreasing heart rate (t [478] = 5.36; $p < .01$). Breaking eye contact (i.e., after having gazed toward spouse's face/eyes) was also significantly less likely to occur during decreasing heart rate (t (478) = 2.60; $p < .05$).

Head nods

Head nodding in the entire sample was lower during decreasing heart rate (t (478) = 3.53; $p < .01$).

Deep breath

Obvious, deep inhalations occurred less often across all episodes of decreasing heart rate (t [478] = 2.61; $p < .05$).

Self-adaptors

Self-adaptors are movements which a person performs that seem primarily intended to relieve discomfort (e.g., scratching) or nervousness (e.g., foot swinging). These types of movements occurred less often during decreasing heart rate (t [478] = 4.14; $p < .01$).

Illustrative gestures

Illustrative gestures are those in which a person uses hands, head, general body or strong facial expressions to gesture in a way that helps illustrate or describe what his/her words are saying. These gestures occurred significantly less often during decreasing heart rate ($\underline{t}$ [478] = 3.78; $p < .01$).

WIVES' DISCOURSE FEATURES DURING DECREASING HEART RATE

In addition to analyzing dyadic behaviors during episodes of changing heart rate, gender differences were examined. During episodes in which the wives' heart rates were changing, none of the coded behaviors significantly discriminated between episodes of decreasing and increasing heart rate. However, when their husbands' heart rates were decreasing, wives were more likely to speak with certainty ($\underline{t}$ [118] = 2.56; $p < .05$), and less likely to take obvious deep breaths ($\underline{t}$ [118] = 2.58; $p < .05$).

HUSBANDS' DISCOURSE FEATURES DURING DECREASING HEART RATE

Analyses of husbands' data showed several significant results, all of them concerning features which were <u>less</u> common during decreasing heart rate.

When husband's own heart rates were decreasing, they were less likely to use humor ($\underline{t}$ [118] = 2.56; $p < .05$), to respond in a neutral manner to a negative remark ($\underline{t}$ [48] = 3.74; $p < .01$), or to use acknowledgement tokens ($\underline{t}$ [118] = 2.58; $p < .05$). Furthermore, they were less likely to gaze toward their wife ($\underline{t}$ [118] = 4.33; $p < .01$), or to perform self-adaptors ($\underline{t}$ [118] = 4.26; $p < .01$).

When their wives' heart rates were decreasing, husbands were less likely to gaze toward their wife (t [118] = 4.50; $p < .01$), or to nod their heads (t [118] = 2.84; $p < .05$).

ADDITIONAL ANALYSES

The study's focus was to determine the discourse features of decreasing heart rate, and Table 2 indicates these features. However, most of the significant results were less likely to occur during episodes of decreasing heart rate, a finding that at first seemed contradictory to the literature. Additional analyses were conducted to follow up on this apparent contradiction.

Rationale

Review of their analyses (Gottman, 1994; Gottman et al., 1998; Gottman, 1999), showed that the Gottman lab found that humor, acknowledgement tokens, affection, and neutral responses to a spouse's negativity preceded decreasing heart rate, rather than that they occurred during decreasing heart rate. As a consequence, it seemed logical to ask: Do the behaviors found to be significantly lower during decreasing heart rate (Table 2, bottom half) actually precede decreasing heart rate?

Method

Trend sequences were analyzed to answer this question. Every episode of increasing heart rate was listed, and the original trend analyses forms were consulted to determine if the episode was within three heartbeats of a subsequent decreasing heart rate trend. (Note that this method linked episodes of increasing heart rate used for analysis with any decreasing trends [at least five seconds long]

in heart rate, regardless of whether the linked trend was also an analyzed episode or not, and regardless of whether the linked trend was primarily silent, an issue in previous analyses.) Episodes of increasing heart rate which were immediately followed by a trend of decreasing heart rate were compared with those which were not succeeded by decreasing heart rate trends. The mean scores on all of the significant variable listed in Table 2 were examined using 2-tailed, independent means t-tests. Bonferroni's correction was applied as in the main analyses.

Results

Humor was more likely to occur during episodes of increasing heart rate which were followed by decreasing heart rate trends ($\underline{t}$ [238] = 3.08; $p < .01$), when analyzed across couples. None of the other results were statistically significant, but those that approached significance trended in the direction of being more frequent during episodes of increasing heart rate which were followed by decreasing heart rate. (Note: the probabilities in these trend reports are reported without statistical correction.) These trends include: humor by husbands (in HH or WH groups) ($\underline{t}$ [118] = 2.17; $p = 0.03$), acknowledgement tokens by husbands whose heart rates were decreasing ($\underline{t}$ [58] = 2.25; $p = 0.03$), eye gaze ($\underline{t}$ (238) = 2.05; $p = 0.04$) across the sample, head nods by wives (WW's $\underline{t}$ [58] = 1.98; $p = 0.05$; and HW's $\underline{t}$ [58] = 2.01; $p = 0.05$), and illustrative gestures by wives' whose husbands were experiencing increased heart rates that would resolve into decreasing heart rates ($\underline{t}$ [58] = 2.16; $p = 0.04$).

Table 2 Discourse Features during Decreasing vs. Increasing Heart Rate

	All	HH	HW	WW	WH
Higher during Decreasing Heart Rate					
Content					
certainty	**	--	*	--	--
only my own perspective	**	--	--	--	--
Lower during Decreasing Heart Rate					
Content					
humor	--	*	--	--	--
acknowledgement token	--	*	--	--	--
respond neutral to spouse negative	--	**	--	--	--
Nonverbal					
eyes toward spouse	**	**	--	--	**
break eye contact	*	--	--	--	--
head nod	**	--	--	--	*
deep breath -- inhale	*	--	*	--	--
self-adaptor	**	**	--	--	--
illustrative gesture	**	--	--	--	--

** p <= .01
* p <= .05
-- = not significant at the .05 level
All = both husbands and wives, both experiencing heart rate changes and being the discussion partner of the person whose heart rate changes
HH = as husband's heart rate changes, his own behavior is coded
HW = as husband's heart rate changes, his wife's behavior is coded
WW = as wife's heart rate changes, her own behavior is coded
WH = as wife's heart rate changes, her husband's behavior is coded

CHAPTER 5: DISCOURSE ANALYSIS

This study has identified features of discourse that are characteristic of a large number of episodes of decreasing heart rate, when compared with episodes of increasing heart rate. The purpose of this chapter is to analyze the actual discourse of two exemplar episodes in order to better understand what is happening in an episode of decreasing heart rate, and, by contrast, what is happening in an episode of increasing heart rate. The method of selecting the episodes is explained, followed by an analysis of several features of the discourse.

METHOD OF SELECTING EPISODES FOR ANALYSIS

The videotapes of the entire discussions were reviewed repeatedly, followed by intensive examination of the individual episodes of decreasing and increasing heart rate. Although the coding and statistical analyses pointed out several differing features of these episodes (see Chapter 4), it seemed possible that other features besides those previously coded might be present and might help form patterns of behaviors. However, repeated examinations failed to reveal any obvious patterns of behaviors across either set of episodes (except for the more frequent occurrence of large physical movements during episodes of increasing heart rate).

Since the differences between episode types appeared to be subtle in nature, it seemed logical to ground this analysis in the most polarized conditions available. Assuming that both spouses' physiological states are likely to affect the interaction, episodes were sought in which both the husband and the wife were

simultaneously experiencing decreases in heart rate. A similar search was made for episodes of simultaneously increasing heart rate. With both partners undergoing the same sort of physiological state, it was hoped that salient discourse features related to that state would be more evident.

All of the coding sheets of the episodes of decreasing heart rate were reviewed, and the hexadecimal heartbeat values for the spouse at the time of each episode were noted. (Note: the hexadecimal values usually differed between spouses, because these indexed the number of heartbeats occurring since the count began. Thus, if the equipment was started at the same time, the spouse with the faster heart rate would soon have a higher hexadecimal heartbeat number.) These hexadecimal values were compared with episodes in which the spouse's heart rate was also decreasing, to find any that might match. Only two episodes in the sample showed concurrent de-escalation. One of these episodes (15H-1113/15W-10C3) primarily consisted of the wife's venting frustration over a school problem. The other episode (4W-1202/4H-1005) was a problem-solving discussion in which the couple discusses their infrequent sex life since the birth of their first child.

The episodes of increasing heart rate were similarly reviewed, and two concurrent escalating episodes were found. One of these (7W-1122/7H-D92) focused on a complaint and change of topic. The other (6W-BE9/6H-1340) was a problem-solving discussion, with the couple discussing whether or not to go to mediation with the wife's brother over a business/family problem.

Several questions proposed by Wood and Kroger (2000), Bulmer (1979), and Tannen (1984) were employed as tools to help understand the conversations. Specifically, answers were written out regarding: what is happening in the episode, context, power, who wants change, locus of the problem, affective tone, agent/patient, implications of nonverbal communication, languages from different domains, footing of arguments, participants' categories of people and events, facework, functions of the discourse, utility, what participants orient to as meaningful, negotiation of new positions, actions which could be justified by this discourse, metaphors, and sensitizing concepts from other literature. In addition, the discourse analytic literature was perused for suggestions relating to specific discourse features in the episodes.

The two problem-solving discussions were selected as the foci for this analysis, both because they were more interesting, and because they best corresponded with this study's research focus on discourse during problem-solving. The present tense will be used during the analysis section to focus attention on present conditions at the moments being analyzed.

ANALYSIS

In the two problem-solving episodes selected for analysis, there is no indication that either couple is aware of the physiological currents flowing beneath their discussions. Indeed, on the surface, both conversations show couples that are intensely interested in each other, willing to listen to the other person, and fully focused on the problem being discussed. However, as this chapter will show, while both couples are discussing delicate topics – couple #4 is

talking about sex, while couple #6 are discussing some very convoluted (their word) in-law problems, and both wives are constructing arguments -- stating theses and supporting their view with multiple points, there are some significant differences. The episode of decreasing heart rate offers an excellent example of certainty, "only my own perspective", and gentleness. In contrast, the episode in which heart rates are increasing is filled with cautious maneuverings and a show of listening behavior, such as acknowledgement tokens.

AN EPISODE OF DE-ESCALATING HEART RATE

The first episode analyzed involves talk in a couple whose heart rates are both decreasing. Transcription conventions are found in Appendix F. Here is the episode in full:

4W-1202 and 4H-1005 Coordinated De-escalating Episode

(W plays with her fingers throughout clip)
(W's heart rate begins to decrease)
(H glances away, then looks back to W)
(W looks at H as he begins)

4H (H uses soft voice)
'cause we're putting
(H's voice becomes warm, face relaxes, lip corners turn up)
Tanner down
and (..)
(H's heart rate begins to decrease)

(W nods)
4W mm hmm

4H we're getting him all ready
(H moves hands in lap, then they stay still)
for night time and

4W Well,
(W glances away)
and there's
(W glances back)
no way
(H's eyes widen, lip corners straighten)
we could
(W tightens eyes/cheeks/eyebrows)
(W moves head forward, shakes head slightly)
do it
any other <u>way.</u> (..)
I mean,
it would be the
(W's heart rate stops decreasing)
most
(H's heart rate begins increasing)
[stressful experience in the world to have him
scre::aming in the other room]

Delicate Topic

The issue that couple #4 are discussing is sex. Since their nine-month-old son (renamed "Tanner" for the purpose of this study) was born, their opportunity to engage in this type of intimacy has diminished greatly. The wife (4W) frames this portion of their conversation together by commenting to her husband (4H) that "it's hard for me to be spontaneous, as you know, right now." Her tone is matter-of-fact, generally unembarrassed, although it becomes quieter during discussion of particularly confidential points, such as the fact that she sometimes still experiences pain during intercourse. Her volume is approximately normal as she says, "I think the other thing is that we do wait (…) until it's like (..) really, really late at night."

Just prior to 4W's statement about waiting until late at night, 4H has been sitting rigidly in his chair. His cheeks are tense, his mouth turned down a little,

eyes averted. As 4W speaks, 4H changes his gaze to look directly at her by the word "wait" and his eyes stay riveted on her face as he straightens in his chair. He glances away and back, adjusts to a slightly backward lean, and takes a deep breath. This initial discussion was about sex, and speaking about sex seemed to exacerbate 4H's tension, as illustrated by his frequent self-adaptors (i.e., shifting posture in his chair, playing with his hands), short responses, and low volume during this portion of the discussion. In addition, the couple later commented on the fact that 4H is "camera shy," and this episode occurred in the first few minutes of their discussion, when he had not had much time to habituate.

Argument

4W is in the process of constructing an argument, proposing a main thesis and presenting multiple points to support it. Her thesis is that she is not currently able to be spontaneous in their sex life. Her main points explain why this is so: because she takes a long time to get sexually aroused, because she fears the pain still associated with intercourse, and (the current main point) because they do not initiate intimacy until it is "really really late at night." In this episode, 4H cooperates in 4W's argument. 4H begins his comments with the contraction "'cause" and he offers a rationale for why they wait until late at night to initiate intercourse: "'Cause we're putting Tanner down and we're getting him all ready for night time." His tone is not defensive or blaming, but is rather slow and methodical as he starts. He seems to be interested in helping identify causes that they can then work together to solve.

Prosody

Attitude can be expressed through prosodic means (Maxwell, 1993). Volume, rate, rhythm, and tone combine in this episode to display an attitude of gentleness on the part of 4H, and to portray 4W's attitude of being certain, yet willing to see another perspective.

4H's gentleness

4H begins his statement with a soft voice and a slightly slower rate of speaking, which continue throughout his speaking turn in this episode. The low volume reflects the "confidential" nature of the discussion, but it also is consistent with 4H's express intent to treat this situation with a gentle touch, not to be pushy or forceful. Later in the conversation, he explicitly states, "'Cause I don't want to be (…) demanding or something." Slowing down also reduces the forcefulness of his speech, and these features combine with his attentive gaze and frequent lack of gestures to create a sense of waiting, of not pushing. As noted earlier, 4H is tense, but he does not display this tension with overt activity, as 6H will in the next analyzed episode. Instead, 4H uses his eyes (riveted on 4W) and his voice (soft, slow, warm) to express attentive interest, while his rigid, waiting stance suggests that he is waiting for the right moment to express his views. Waiting and watching for the time when 4W will be able to hear (or, in her case, perhaps speak – since she is more vocal) his point, 4H is not demanding, not demeaning, but rather comes across as gentle and patient.

4H answers 4W's complaint with the couplets: "we're putting Tanner down and (..) we're getting him all ready for night time." These couplets create

the effect of a lullaby, gentle and easy to hear. This is partly because his use of the trochaic foot, with stressed/unstressed syllables, gives a "singing quality" (Byrne, 2001) to his rendition. "PUT/ting" "TAN/ner" "DOWN/and" are all trochaic feet, as are "GET/ting" "HIM/all" "READ/y." Even though each line is prefaced with two unstressed syllables, and the second line's rhythm changes at the last "for NIGHT TIME," a sense of singing underlies this couplet. Furthermore, 4H speaks his lines in a lilting manner, emphasizing their rhythmic qualities. Upon the repetition of the format: "we're (verb)ing (child) (description of activity)," 4H's heart rate begins decreasing. Rhythm and repetition help make these statements sound gentle, easy to hear, and may make the second line easy to say as well.

The tone of 4H's words begins as a matter-of-fact statement "'cause we're putting." However, as he says his baby's name, his voice becomes warm and reminiscent, trailing off in intensity, and he almost smiles. This gentle, warm tone of voice continues through his speaking turn, and the almost-smile continues into 4W's turn. Tanner may be one cause of their problem, but 4H's manner makes it clear that he is also a joy. This tender attitude toward parenting is portrays 4H's gentleness very effectively.

4W's certainty (with openness)

The use of volume and rate is different for 4W. As she acknowledges 4H's comments with a nod and "mm hmmm," she speaks at both a volume and a rate that is close to her normal voice in this conversation. As she enters her speaking turn, 4W pauses for a brief "Well, and" (discussed below) then launches

full-scale into making her point, with scarcely a pause between words until she has built the case that there is "no way we could do it any other way." This flow of words is even, un-rushed. 4W is certain about what she is saying, and needs no extra pauses or time for thought as she expresses it. Her confidence is accented by the shake of her head and the way she thrusts her head forward as she speaks, but the slightness of the head movements suggest a measure of restraint so that her demeanor does not feel like she is challenging 4H, but rather is expressing her own (strong) opinion.

4W's rhythm is completely different from that offered by 4H in this episode. Her words are primarily of one-syllable, short, sharp, and to the point, and she says them in a choppy manner, quite different from his singing tone. If 4H is becoming lulled into harmonious memories, 4W's statement is likely to wake him up, now! Indeed, as she delivers her first "no way," 4H's eyes widen and his face becomes serious. The quick, choppy delivery underlines that 4W knows exactly what she wants to say, and is ready to say it.

The tone of W's voice is assured, confident. She begins by emphasizing the discourse particle "Well," (Gee, 1999) (discussed below) with a rising inflection, but her statement continues with a falling pitch, suggesting certainty (O'Donnell, 1990). Word choice (discussed below) also makes her statement sound completely certain. However, 4W's direct, confident expression of her thoughts about Tanner's bedtime ritual is softened by two other elements of her discourse. First, even as she declares, "There's no way we could do it any other way," she emphasizes the word "do" by pulling together eyes, eyebrows, and high

cheek muscles together. This creates a tight, puzzled face, the antithesis of the unequivocal assurance that she otherwise portrays.

Second, the pitch of the final word "way" occurs in a rising-falling pattern. This tonal pattern "conveys a sense of initial uncertainty but turning into certainty" (O'Donnell, 1990, p. 222). Coming, as it does, after a long statement with falling pitch, it has the effect of saying "I'm pretty sure about this, but I might possibly wrong" This suggests that while she is confident that her analysis is correct, she is open to hearing another perspective, if 4H has another suggestion.

Word Choice

Word selection is interesting in this episode of concurrently decreasing heart rates. Use of the pronominal "we" by both 4H and 4W suggest their sense of unity, and 4W's choice of extreme words demonstrates her attitude of certainty in this conversation, while her use of concessionary marker "I mean" softens the effect of her strong declarative statements.

Pronominalization

The use of pronouns can be one indication of how people think about one another (Maxwell, 1993). Couple #4 use "we" in every case in which they are describing their actions: "we're putting Tanner down", "we're getting him all ready", and "no way we could do it any other way". Both 4H and 4W say "we," suggesting that they think of themselves as a couple, rather than as two individuals, such as might be implied by "you" and "I." The only use of "I"

comes as a part of the concession marker, “I mean” which 4W employs between statements.

The other pronoun used in this conversation, “him,” takes the place of their baby’s name in 4H’s second couplet “getting him all ready” for bed, and the very mention of his name seems to bring joy to 4H, as his voice becomes warm and tender in pronouncing the baby’s name.

Extreme case formulation

4W’s certainty in this conversation is best expressed in her words: “I think the other thing is that we do wait (…) until it’s like (..) really, really late at night. (inhale)”. Although she introduces her point with the mitigator “I think” that avoids a face-threat for either 4H or herself (Jaworski & Coupland), the repetition of the word “really” is the first indication of the extreme case formulation (Antaki & Wetherell, 1999) she is building during this episode. Even “I think” is used less as an acknowledgement that this may be inaccurate and more as a confident report of her cognition, as displayed by her falling pitch on the word “think”

As 4H speaks his lilting couplet “’cause we’re putting Tanner down …,” 4W nods to acknowledges his contribution. When 4H pauses and lifts his hands, ending the second line with a partially enunciated “and,” he may be signaling his willingness to give up the floor (Jaworski & Coupland, 1999). In any case, 4W steps in. Her “Well, and” acknowledges and apparently accepts 4H’s analysis of the late night problem as centering around the baby’s bedtime rituals. Her own next statement, however, expresses her certainty that these rituals are a vital part of their nightly schedule. In the context of their overall discussion, it seems clear

that 4W is arguing that sex should not be allowed to interfere with this parenting responsibility.

4W passionately declares that "there's no way we could do it any other way." "No way" and "any other way" demonstrate 4W's certainty that she is right. This confidence spills into an another extreme case formulation which stretches beyond the de-escalating episode: "It would be the most stressful experience in the world to have him scre::aming in the other room" while they are having sex. "Most stressful" and "in the world" interact with the vivid word "screaming," which 4W emphasizes both vocally and with a hand gesture to create a truly extreme case. It is ironic that 4W's heart stops decreasing as she talks about the "most stressful experience in the world" (and 4H begins an increasing heart rate trend as he listens to this statement).

Discourse particle and concessionary marker

The certainty demonstrated in 4W's extreme statements of her opinion could engender a sense of defensiveness and antagonism in some situations. However, in addition to the facial expression and pitch change discussed above, 4W's willingness to consider another perspective is encoded in her use of the discourse particle "Well" coupled with "and", and in the concessionary marker "I mean."

As 4H completes his couplet and pauses, 4W interjects the discourse particle "Well," followed immediately by "and." "Well, and" serves the purpose of signaling 4H that she is accepting his view as (at least partially) correct ("Well") and that the new statement she is making will add to the argument they

are building together ("and"). Gee (1999) notes that discourse particles "help tie sentences together … [so they] 'sound' like they go together" (p. 160), and signal the relationship between sentences. "Well, but" would serve to signal that she was going to present an adversarial claim, but "Well, and" suggests that her next statement extends his comment.

Later, 4W has makes a very strong proposition -- "there's no way we could do it any other way." In a moment, she will extend it into the hyperbolic "most stressful experience in the world," but first she pauses for three beats after delivering her first ringing statement of "truth" and starts anew with "I mean." This insertion of the concessionary marker "I mean" suggests admits that this is, after all, only her perspective, only what "I mean." This effectively softens 4W's overt certainty and allows her to appear open to another perspective.

This interaction of extreme certainty with indications of fallibility (or at least a recognition that 4H may have a different perspective) allows 4W to express her feelings vividly, while still portraying some degree of openness to 4H's input. 4H does not take offense at this strategy. In fact, as 4W launches into her "most stressful" extreme case formulation, 4H begins to smile. 4W's certainty is so complete, her description so dramatic, that both 4W and 4H dissolve into laughter at the idea of trying to be intimate while Tanner howls in protest a room away. Although the laughter is not a part of the de-escalating episode, it feels like a natural, spontaneous denouement of their interaction during the time their heart rates were decreasing.

Summary

Couple #4 discussed a delicate topic and co-created their argument with certainty, openness to another perspective, and gentleness. The prosodic cues of volume, rate, rhythm, and tone combined with selection of words in pronominalization, extreme case formulation, use of discourse particles and concessionary markers to create a sense of strong opinion tempered with respect and caring. This episode provides only one example of discourse accompanying decreasing heart rate, and its findings will not apply to all de-escalating episodes. However, certainty and openness to another perspective, displayed in this episode, illustrate this study's previous findings. Their combination with gentleness demonstrates in the discourse of an actual couple what Gottman et al. (1998, p. 17) characterized as ideal – a "model of gentleness, soothing, and de-escalation of negativity." Researchers, counselors, and couples wishing for some skin on the bones of theory may find this episode to be a useful example of communication by a couple during de-escalating heart rate.

AN EPISODE OF ESCALATING HEART RATE

In order to better understand the difference between episodes of decreasing versus increasing heart rate, a contrasting exemplar episode was analyzed. In this episode, both spouses' heart rates were increasing. Here is the episode in full:

6W-BE9 and 6H-1340 Coordinated Escalating Episode

(H is looking down, W is looking at H as episode begins)
(W makes small, precise gestures with both hands throughout the episode)

6W [because I heard]

(W's heart rate begins increasing)
what you said
about (….)
(H brushes off pants leg with one hand)
(W looks at H)
(H's heart rate begins increasing)
(W says "you know" in soft voice)
you know
how you feel
about
how he approached (.)
(W looks down)
me,=

(H nods, grimaces, picks something off pants leg)
6H =okay=

(W's hands gesture toward herself and out toward H)
6W =through me
to get to you.
(W's heart rate stops increasing)

6H yep
(H scratches pants leg, three short times)
(W inhales)
(W gazes at a point above and beyond H)
6W Umm (…)
(W exhales during pause)
(H looks up, chin high, glances at W)
(W moves head and looks at H, her hands gesture)
and it's a point
(H moves gaze to a point above W)
about the mediation.

6H mm hmm?
(H nods slightly, chin still high)

6W If we
(W looks down)
were
(H's heart rate stops increasing)
[to choose to do the mediation]

Like Couple #4, Couple #6 are discussing a delicate topic and 6W is building an argument. Unlike the previous episode, however, the primary features of increasing heart rate in this episode are caution and a show of listening. These are examined using the vehicles of prosody, nonvocal behavior, and word choice.

Delicate Topic

Couple #6 have in-law problems. Several years ago, they stopped communicating with the 6W's brother, whom we will call "David," after he absconded with a part of 6H's business. The situation has resulted in an almost complete breakdown of communication between Couple #6 and 6W's family. Recently, David approached 6W to ask if she and 6H would be interested in going to mediation with him and his wife. 6W has tried several times to discuss this with 6H since David's visit, but 6H is not very willing to talk about it. In fact, he has only agreed to discuss it now "(sigh) for the benefit of the study."

In the talk just preceding the episode to be analyzed, 6H is explicit about the fact that while he does not ideologically oppose going to mediation, he does not want to go into mediation under the present unclear circumstances: "I'm sure as heck not going to uh capitulate on something that (..) I felt that I was slammed in the corner anyway on."

Well-formed Argument

Like 4W, 6W is engaged in creating an argument. The main thesis that 6W has stated thus far in the conversation is that she wants to know what answer to give David regarding the mediation. 6H has essentially answered her query,

using the metaphor of being "slammed into a corner" to describe his antipathy toward mediation under the present circumstances. This is the answer for which 6W has professed to be waiting. However, now 6W ignores 6H's passion (and his answer).

Instead, she changes topics, saying in a neutral voice, "I want to bring up another point." This new point does not support her ostensible thesis of getting an answer, since the answer has just been given. It does, however, expose the thesis which has been the substrate throughout the discussion: to persuade 6H to go to mediation. The episode to be analyzed occurs just as 6W introduces the change of topic, preparatory to stating her new argument. Kendon (1992/1999) notes that both parties must agree before a topic change can actually occur, and it may be that 6W's uncertainty about 6H's agreement with this new topic is commensurate with her increase in heart rate.

6H has participated freely in the conversation up to this point. His last comment was both emotionally expressive and a clear answer to 6W's original question. When she ignores his answer and brings up "another point," 6H averts his gaze and focuses his attention on bits of dust or lint clinging to his pants. He waits, nodding and offering acknowledgement tokens as 6W introduces her point. When he does not interrupt her after her introduction, 6W offers a full, lengthy (65 seconds) explanation of her idea. 6H attempts to re-enter the conversation at one point, using both hands in an open gesture and saying "Yeah," but 6W continues her explanation, and he waits until she is finished before he tries again to reply.

Prosody and Nonvocal Behavior

Caution is evident in 6W's use of pitch, rate, rhythm, tone, and gesture, while 6H's pitch and acknowledgement tokens suggest that he is listening carefully, a suggestion subverted by his nonvocal behavior.

6W's caution

Pitch: Rising pitch occurs frequently in 6W's talk, indicating her uncertainty (O'Donnell, 1990) and suggesting that she is cautious about what she is doing. "Because I heard" has a pitch bend that rises from the first syllable to the last, a pattern replicated in: "what you said," "how you feel," "how he approached," and "to get to you." These changes in pitch are not dramatic, but with 6W's otherwise flat affect, the effect is of indecision, uncertainty, caution, but not of accusation. The single pitch bend that is noticeably different is when she uses a rising-falling-rising contour on the phrase "through me." The falling pitch at the end of "through" makes it sound almost like a two-syllable word, but also conveys the sense that she is certain that "through" is the correct word. This certainty derives from an earlier contradiction of terms in the conversation, in which 6H emphatically noted that David had gone "through you" to get to him, so 6W is "getting it right" by using 6H's construction. This small bit of certainty is followed by a rising pitch on "me," which suggests the surprise and affront that 6W feels at having been used as a conduit between her brother and her husband.

Rate. 6W begins the episode speaking at the rate of speed that is normal for her at other points in the conversation. However, even though her phrases generally come out at a reasonable speed, they are punctuated by awkward

construction and unusual pauses, as described below. The effect is of a halting, disjointed communication.

Rhythm. Repeated use of three-syllable phrases, many of which were spoken as anapestic feet (unstressed, unstressed, stressed syllable) (Jenkins, 2002), should provide a dancing sense of rhythm. However, 6W's rate of speaking is broken by awkward pauses. She starts fluently enough, but as her heart rate begins to increase, she pauses for a long time after "what you said about" to cautiously formulate her next statement. Another awkward pause occurs in the statement "about how he approached (.) me" with the hesitation in this case sounding more painful than practical. Her pitch moves down on "me," but the hesitation suggests that she may feel that she was used, and she is not pleased with that fact. Alternately, it could be that she realizes that she is about to transgress 6H's definition of the incident, because she immediately rephrases the statement: "through me to get to you." Her pausing continues even after her heart rate stops increasing, although she becomes more fluent as she begins to actually state her main point.

Tone. Just before 6W's trend of increasing heart rate begins, 6H has adamantly declared that he does not want to go to mediation. 6W does not respond to his declaration. Instead, she lifts her eyes from their downward position, briefly glances past 6H's gaze, and looks into space somewhere above his head. Avoiding his gaze, she also avoids acknowledging 6H's passion, ignoring his point as she abruptly changes the topic. In a blandly neutral tone of voice, she says, "I'd like to bring up another point." Her unemotional tone is a

direct contrast to 6H's emotional statement, but it makes sense on at least two levels. First, by ignoring 6H's vivid "slammed into a corner anyway" comment, she can "act as if an event that contains a threatening expression has not occurred at all" (Goffman, 1967/1999, p. 311). This is a useful fiction because a) it allows her to avoid 6H's negative emotion, and b) she can pretend that she did not hear the implicit "no" in his argument, therefore avoiding loss of face as she seeks to re-frame and re-introduce the issue.

Second, reacting unemotionally can be a defensive measure designed to prevent threats to face. Beyond merely (not) reacting to 6H's comment, 6W is treading the delicate line of reformulating her argument. She avoids face-threat for herself by presenting a "front of diffidence and composure, suppressing any show of feeling" (Goffman, 1967/1999, p. 310) until she knows how 6H will respond to her new appeal. If he is supportive, she may risk investing emotion, but if he does not "buy" her new focus enough to listen, the face-threat is minimized if she can maintain her cool, unflappable, logical face, with minimal passion involved. The neutral tone is therefore another example of caution, and an important element in making the introduction to her argument less threatening to deliver.

Gestures. 6W accompanies her entire introduction to the new point with careful, precise movements of her hands. Her hands operate in an invisible rectangle that starts about waist-level and rises to mid-chest, reaching slightly beyond the body to either side. Within this area, her hands introduce the argument, shape it into another point, mark the rhythm of her phrases, and

emphasize the way David had tried to go "through me" to "get to you." She stops motioning briefly during "Umm (…)", then resumes gesturing throughout the rest of the episode. These gestures serve to illustrate her words, displaying the interest and energy of her argument in a way that her neutral mien does not. Her hands are beautifully fluid and articulate, sometimes carrying her halting words. Yet the invisible rectangle within which the gestures occur, with its apparently rigid boundaries that her hands never venture beyond, suggests that caution is at work here, also. Restraint in the form and strength of the gestures themselves is yet another indication that more is going on than meets the eye.

6H's listening hard(ly)

Pitch. 6H says very little in this episode. When he does speak, however, he using the falling tone twice, and a rising tone once. The falling tone occurs as he responds to 6W's difficult characterizations of David's behavior. In both "okay" and "yep," the pitch bends downward toward certainty (O'Donnell, 1990). After 6W finally restates her plan to introduce a new point by stating, "And it's a point about the mediation," 6H responds with a questioning "Mm hmm?" This might be taken as an invitation to talk openly, except that his nonvocal behavior is dissonant with this view, as will be discussed below.

Acknowledgement Tokens. The only verbal additions that 6H brings to this episode are acknowledgement tokens. He latches quick responses to the junctures of 6W's major points, using three different phrases, "okay," "yep," and "mm hmm" to let 6W (and the researcher?) know that he is tracking the conversation. This is reminiscent of the sort of behavior often taught in

counseling, and 6H is proud of his learned skills. (One of his reasons for participating in this study was to share the knowledge he has gained from counseling and from life experiences with other couples who might be thinking of divorcing.) However, when considered with the falling pitch and split-second timing, "okay" and "yep" sound like abbreviations for, "I know, hurry up and finish what you are saying. Let's get this over with."

Nonvocal Behavior. While 6H's acknowledgement tokens are classic examples of active listening behavior, his gaze, facial expression and head movement, and gestures suggest a different picture. 6H looks at his hands, his leg, and the wall, but only at one point does he briefly glance at 6W. This is consonant with the earlier findings of this study, in which behaviors such as eye glances (a combination of eyes toward, plus break eye contact) occurred most often during episodes of increasing heart rate. However, this violates one of the rules typically taught for good listening: to "maintain eye contact with the person or persons you are speaking or listening to" (Dugger, 1992, p. 92). During other parts of this conversation, 6H maintains eye gaze, looking toward 6W's face/eyes while he listens. However, in this episode, while his heart rate is increasing, 6H avoids eye gaze almost completely. 6W looks at him several times, but 6H only tries a brief glance at 6W when she pauses for a long time after "Ummm."

6H's facial expressions and head movements also belie his apparently open-minded listening behavior. As the episode begins, 6H is looking down at his hands, frowning slightly. A muscle in his cheek/jaw area twitches as 6W performs her halting recital introducing her point. 6H tightens his lips and pulls

the middle of the lower lip upward as he focuses on brushing off his pants leg. As 6W makes her speech error (according to their earlier conversation), saying "how he approached me," 6H grimaces, but returns "okay." 6W repairs her error "through me to get to you" and 6H's frown lessens. "Yep," he acknowledges. When 6W pauses and exhales after "Umm," 6H moves his gaze to glances at her briefly, but he raises his chin high in the air. This chin movement, when combined with a tight jaw, tightening around the eyes (which are gazing far away), and downturned, tight lips, feels more like a challenge than like an attempt to really listen well.

6H's begins this episode by playing with his hands, but he quickly shifts focus to his pants leg. As 6W struggles with "what you said about (….) you know", 6H brushes off the top of his pants legs with one hand, using short, efficient movements. From an observer's perspective, he appears to be brushing 6W's argument along, trying to hurry her past the hesitations. When she misstates her brother's actions, 6H twice picks something off of his pants leg and throws it on the floor. As 6W corrects herself to align with 6H's much earlier expression of the brother's actions, 6H says "yep" and scratches the pants leg, as if trying to remove something stuck on the fabric. His gestures are short, sharp, and repetitive, using three energetic small strokes. After 6W gets stuck on "umm", 6H turns his attention away from his pants, rests his hands in his lap, and lifts his chin in the movement described above. Although 6H's gestures do indicate that he is listening, they do not display the immediacy and interest suggested by his verbal acknowledgement tokens. Instead, they seem to "brush

off" the conversation, and to "pick" at its flaws. This suggests less that he is listening hard, and more that he is hardly listening.

Word Choice

As the main speaker in this episode, 6W's use of pronouns, the concessionary marker "you know," and cautious case formulation suggest her aloneness and tension as she moves toward making "another point."

Pronominalization

Throughout her period of increasing heart rate, 6W uses "you," "I," and "me" exclusively when referring to 6H and herself. They are individuals, pitted against each other in the beginning formulation, as "I heard" the things "you said" and "I" intend to use them against "you" in this argument. This is a lonely place to be.

When "he," the brother, enters the scene, however, "me" becomes the object of his approach. The couple is linked by a joint threat as "me" becomes the conduit that "he" uses "to get to you." 6W's gestures eloquently emphasize the fact that "he" went "through me" in this process.

At this point, in the episode, 6W's heart rate stops increasing, The next personal pronoun she uses is "we," in the phrase "If we were to choose to do the mediation." It is interesting that 6H's heart rate also begins decreasing as 6W starts her formal argument by formulating the couple as a "we" again.

Concessionary marker

"You know," straddles the gap between "I heard what you said" and "how you feel." These two dangerously personal remarks are softened by the

concessionary marker (Antaki & Wetherell, 1999) similar to the "I mean" used by 4W. "You know" may occur here partly as an apology for having "heard" 6H talk about something personal. However, this "you know" also seems to function as a plea for understanding and unity, a request that 6H will, indeed "know" and thus be reasonable and reasonably easy to convince.

Cautious case formulation

During the time that her heart rate is increasing, 6W's caution can be seen in the careful way she formulates her case. She uses a subordinate clause to ground her comments in 6H's words, constructs her sentences to reflect the convoluted nature of the problem, creates a sense of indirectness and distance through the use of prepositional phrases, and employs neutral language to avoid losing face. Each of these areas will be discussed in turn.

Subordinate Clause Use. The most striking thing about this episode is the extreme care that 6W takes in bringing up "another point." 6W prefaces her comment by the phrase, "I heard what you said." Selecting this as the first statement creates a context for hearing the rest of the statement (Gee, 1999, p. 157). In this case, this use of primary and subordinate clauses makes 6H's words the point from which the rest of the information is understood,. "How you feel about how he approached me, through me to get to you" becomes dependent on the original phrase "what you said." This effectively absolves 6W from the responsibility of bringing up this undesirable topic herself since 6H has already done so (i.e., in the facilitation period preceding their discussion). This construction also suggests that 6H should not be too quick to silence her, since it

is his own words upon which her comment is based. It grounds the conversation in what 6H had said, making a more secure footing for 6W to use to introduce her point. However, it also suggests that her point needs this sort of grounding in order to be accepted, and is an indication of how cautiously she is approaching her topic.

Sentence Construction. 6W emphasizes the "convoluted" (6H's earlier word) nature of the problem by her sentence construction. Instead of saying with certainty, "I know how you feel," about the way her brother has approached her, or even "I heard how you feel," she says, "I heard what you said about, you know, how you feel." This offers a vivid display of how complicated and difficult the problem is, in her own view, and shows how carefully she is trying to handle it.

Prepositional Phrases. Another index of the caution with which 6W approaches this topic is shown in how she frames the immediate problem. "How you feel about how he approached me, through me to get to you" is fraught with four prepositional phrases ("about how…," "through me," "to me," "to get," "to you"). This makes the whole situation seem less direct.

Neutral Language. 6W uses neutral language to introduce her issue. She begins with "I-language," a form of speaking that is often taught as a non-provocative, non-judgmental way to react to someone's behavior (e.g., Adler & Towne, 1999). This contrasts with the solidarity of "we-language", but provides emotional distance from the problem, and avoids the sound of accusation. 6W's careful start is not lost on 6H. Later, he comments "I'm hearing you use that neutral gui[de]" and he goes on to comment about the point she is making.

6W seems reluctant to say exactly what David has done, although his strategy of going "through me to get to you" is clear to both 6W and 6H in other parts of the conversation. Perhaps 6W does not want to make explicit exactly what her brother has done, preferring the vagueness of imprecise terms to a starkly negative descriptor of his actions. Earlier in the conversation, she referred to his behaviors as "the issue – let's just put it that way." This corresponds with Goffman's (1967/1999) idea of using "careful ambiguity" (p. 311) to preserve another's face. In this case, there are potentially three faces to preserve – 6W's, 6H's, and her brother's. The fact that 6W uses ambiguity to discuss David's actions suggests that his face is still important to her, although she has earlier agreed with 6H that her brother's actions were not appropriate.

6W also employs ambiguity in speaking of her husband's emotion. Earlier, she ignored his emotional rhetoric. Now, she does not name her husband's emotion as she carefully works around "how you feel about how he approached (.) me". Is he angry? frustrated? betrayed? worried? sad? regretful? It is obvious from other portions of the conversation that the feeling is negatively valenced, but 6W does not specify or elaborate. Again, Goffman's work suggests that this may be a type of protective avoidance. It is possible that the uncertain "feel" is preferable to the certain, but too stringent, "furious" or a similar emotion. Not naming, then, is a way of staying neutral, of being cautious, of not "knowing" certain unpleasant "truths." Naming them might provoke more trouble, lose more face, and 6W is already experiencing aversive physiological arousal.

After she finishes her awkward construction of "to (.) me, through me to get to you." 6W's heart rate decreases. It may be that she has been afraid that she wouldn't be allowed to "get to" 6H herself, to make her point. Now, with her cautiously phrased, neutral introduction having been accepted as "okay," 6W's heart rate declines and she continues until she has fully expressed her point.

Summary

As Couple #6 discuss their in-law issue and enter a new phase of their argument, the prosodic cues of pitch, rate, rhythm, and tone combine with gesture and acknowledgement tokens to create a sense of caution and equivocal listening. Pronominalization and a concessionary marker suggest the wife's sense of aloneness as she cautiously formulates her case, using subordinate clauses, sentence construction, prepositional phrases, and neutral language to frame an introduction to her next point that will allow her to proceed. In this example of the discourse associated with increasing heart rate, tension was indicated in both the wife's cautious machinations and in the husband's overt listening behavior (subverted by a covert sense of wanting to finish this portion of the conversation). Several of the cues found in this study (see Chapter 4) to be more frequent during increasing heart rate were demonstrated in this episode of increasing heart rate, including: acknowledgement tokens by the husband, head nods, making and breaking eye contact, illustrative gestures, and self-adaptors.

DISCUSSION

This is the first study of which the author is aware that seeks to directly relate a physiological state to the discourse occurring during that state. The two

episodes used for this analysis were drawn from polar ends of the physiological arousal continuum. The episode of decreasing heart rate featured gentleness, certainty, and a willingness to recognize that the other person might have another perspective. The discourse during this episode was cooperative, allowing easy, open expressions of their thoughts about the topics of concern to the couple.

The episode of increasing heart rate, on the other hand, featured cautious words and careful listening (or its appearance). The discourse during this episode was tense, guarded, circumspect The wife appeared concerned that the husband would refuse to listen to her statement, while the husband seemed wary about what she was planning to do with her next point. Both tried to use the skills gained through marital counseling to help navigate their way through this difficult transition between arguments, but the sense of joint communication so apparent in the de-escalating episode was absent during the escalating episode.

Many of the discourse features found to be statistically significant in the earlier portion of this study reappeared in these episodes. Certainty and "only my own perspective" were beautifully demonstrated in the episode of decreasing heart rate, while the episode of increasing heart rate included acknowledgement tokens, head nods, self-adaptors, and illustrative gestures. This study demonstrates definite differences between the discourse which occurs when heart rates are decreasing and that which takes place when heart rates are increasing. These discourse features may legitimately be considered to represent the discourse of escalating versus de-escalating heart rate, and as such they suggest a new layer of interaction to which students of communication can look when

attempting to decipher what is happening as couples communicate. Other studies will be needed to refine and expand on the observations of this study, and to increase our understanding of how changing physiological arousal and communication relate.

CHAPTER 6: DISCUSSION

Married couples need to periodically decrease their heart rates during marital problem-solving discussions in order to reduce their risk of divorce (Gottman et al., 1998). Little has been known about what cues might be used to identify when heart rate is decreasing (Weiss & Heyman, 1990). This study sought to identify the features of discourse that characterize episodes of decreasing heart rate during marital problem-solving discussions. This chapter discusses features of discourse that characterized decreasing heart rate in this study, those that were more common during increasing heart rate, and those that were not related to changing heart rate. Implications of the in-depth discourse analysis, methodological suggestions, and study limitations are also examined. Finally, directions for future research are proposed.

FEATURES OF DECREASING HEART RATE

The primary features of discourse that occurred during decreasing heart rate in this study were those of certainty in expressing one's own views, and a recognition that the other person might have a different perspective. These will be discussed, followed by an analysis of how they fit with Fruzzetti and Jacobson's (1990) and Gottman's (1994) models of marital conflict. Humor was also associated with decreasing heart rate, often occurring in escalating episodes that preceded decreasing heart rate. Finally, silence was not specifically coded in this study, but it commonly occurred during trends of decreasing heart rate.

Certainty

Certainty is a category not previous reported in the literature of decreasing physiological arousal. It was placed in the coding scheme after observers noticed many instances in the videotaped discussions of participants speaking with absolute assurance, either in word (e.g., "always," "everything," "never," "it's wrong!") or in tone. This behavior was sufficiently intriguing to prompt the inclusion of certainty as an exploratory category in the coding sheets.

During de-escalating episodes, certainty was not linked with either predominantly positive or primarily negative behaviors. Instead, people tended to use certainty during decreasing heart rate to state their points, with the valence of statements of certainty reflected the valence of the argument already underway.

As examples, consider two different statements in which husbands accused their wives of not performing their obligations. In Couple D002C, 2H (husband) sat with his arms folded and his face set in a stony expression. He used a belligerent tone of voice to accuse 2W of not visiting his mother's home with him. She replied with complete certainty and a defensive tone: "[I didn't go with you] <u>one time</u> when you had to drop off the quad, and she [mother-in-law] was out gardening anyways …" Their interactions conveyed a great deal of negativity throughout their discussion.

As a contrast, in Couple D012C, 12H accused 12W of neglecting him sexually, citing the night before as an example. 12W leaned forward and her eyes lit up as she exclaimed, "<u>Really!</u> Last night I was in bed before you got in." Her tone was completely certain, brooking no nonsense, but her delivery engaged him

in a positive fashion. 12H reframed his argument, and their continuing conversation included many positive moments.

Since impulsive, aggressive actions are often performed by people experiencing high arousal (e.g., Buss, 1961; Berkowitz, 1993, 1994; Zillmann, 1990, 1994), one might expect that people experiencing decreasing arousal would behave in the opposite manner, acting rational, pleasant, and/or calm. Certainty does not seem to fit this image. One explanation for this discrepancy is that the overall tenor of the conflict may influence the discourse of decreasing arousal. In these discussions, it appears that decreases in heart rate offered participants the cognitive room to state their arguments more clearly and passionately. It is logical that some cognitively-able people will choose negative, rather than positive, statements as the next step in their arguments, and speak those statements with undeniable assurance and persuasive force.

Another explanation for why certainty is a feature of decreasing arousal refers back to this study's original definition of physiological arousal as "physiological activation elicited by the perception of a need for action." Bold, unquestionable statements of certainty may function as "action," thus decreasing physiological activation/arousal. A person speaking with certainty is taking an active approach toward the conflict, and this blunt appraisal may be just the "action" needed in order to move the conversation forward. At a minimum, these statements "say it like it is." Meeting the need for action with strong verbal actions may discharge physiological arousal (Cannon, 1963; Zillmann, 1990).

Perceiving that the need is being met may permit the heart rate to decrease as the verbal action is being taken.

Alternately, certainty may occur during decreasing heart rate because people may be more "in control" physiologically at these times. Perceived control facilitates self-soothing (Zeltzer & Feldman, 1999). While it is not clear how changes in heart rate are perceived by the individual experiencing them, or by their spouse in a marital conversation, it is likely that a sense of "okayness" or "control" often accompanies decreased arousal (Zillmann, 1990). Using extreme words and a tone of conviction may add to a person's sense of control in the situation, so the effect may be recursive.

Still another explanation may be that certainty reflects a sense of safety that is sometimes rooted in the physiological "okayness" of decreasing heart rate. Roloff & Cloven (1990) studied the chilling effect, or reluctance to speak one's mind. They found that people who felt that their dating partners had more relational alternatives were less likely to discuss irritations with their partner and more likely to withhold grievances. It may be that a certain level of comfort (physiological, in the case of the present study) is a necessary prerequisite to stating one's mind. In this study, decreasing discourse seemed to offer the perfect stage for a "warming effect" – saying what was on one's mind, and in no uncertain terms.

While certainty was statistically significant across couples, it was also characteristic of the talk of wives during episodes in which their husbands' heart rates were decreasing. This latter finding is consistent with Hojjat's (2000)

finding that wives report using more assertive strategies during conflict than do men. It is less clear why wives used certainty most often during their husband's episodes of decreasing heart rate, rather than during their own episodes of decreasing heart rate. Perhaps, with their general facility in decoding nonverbal cues (Brody & Hall, 1993), wives were able to perceive times that their husbands' heart rates were decreasing, and to make their statements of certainty during these times, when the husbands should be more capable of understanding.

"Only My Own Perspective"

Statements that suggest openness to another viewpoint are easier to reconcile with popular conceptions of reduced negativity during decreased arousal. Zillmann (1990, 1994) notes that cognitions narrow with increased arousal, so it would seem logical that they may broaden again with decreasing arousal. Certainly an awareness of another's potentially different viewpoint suggests a broadened perspective and increased likelihood of cognitive capability.

Research suggests that people tend to focus primarily on their own perspective during conflict (Zillmann, 1990). Even later attributions of the other's perspective tend to be undifferentiated and simplistic (Sillars, Roberts, Leonard & Dun, 2000). If this is true of post-conflict attributions, perhaps the fact that the participants in the present study were capable of recognizing a partner's perspective <u>during</u> conflict is a triumph of sorts. Such recognition occurred during decreasing heart rate and was significantly less frequent during increasing heart rate, underlining the importance of physiological factors in the ability to take other-centered perspectives.

Intersection of Certainty and "Only my Own Perspective"

At first glance, certainty and "only my own perspective" appear to be antithetical, and they commonly occur in different episodes of decreasing heart rate. However, certainty and recognition of another's perspective co-occur in episodes such as: "[We argue] about something I don't even care about, and that makes me even more mad because we're fighting about something so stupid (….) to me." (14H-H-16AC), and "Recreational stuff! – that's really isn't a big problem to me, you know what I mean, I mean none of them are like real major problems" (7H-H-DA3). In both of these examples, the husband makes a statement of certainty -- "We're fighting about something so stupid" "none of them are like real major problems". These declarations are accompanied by cues– "to me" and "to me, you know what I mean, I mean" -- that suggest that the speaker recognizes that his wife may have another view of the issue.

Certainty and Own Perspective in Models of Marriage

According to Fruzzetti and Jacobson's (1990) model, low or moderate physiological arousal during marital conflict should result in "engagement in resolution-focused interaction" (p. 122). Expressions of certainty in the context of marital problem-solving are consonant with this prediction, since certainty is an action likely to move a couple toward more engagement (see also Hojjat, 2000). An attitude of openness to another's perspective also seems likely to increase the probability of continued discussion and help to make possible successful resolution.

While certainty occurs during episodes of decreasing heart rate, it may not always contribute to continuing that de-escalation, as can be demonstrated in Gottman's (1994) triadic model. If we assume that the perception of the relationship is positive, then when physiological arousal is low, behaviors ought to be primarily positive in nature. Certainty plays a dual role in the context of conflict. Sometimes it seems to be a positive behavior, supporting decreasing heart rate. At other times, things said with certainty can lead to increased physiological arousal. For example, when a statement of certainty raises concerns for the spouse, the ensuing interaction sometimes results in increased heart rate for one or both partners (Couple D012C have an example of this.). When the balance of behaviors becomes negative, Gottman's model suggests that physiological arousal would increase (again assuming the perception of the relationship is held constant). It is ironic that one of the very behaviors that indicate that a person's heart rate is decreasing – certainty – may also be the means of increasing one or both partners' heart rates.

Humor

In this study, humor preceded decreasing heart rate, occurring during escalating episodes which were followed by trends of decreasing heart rate. This supports Gottman et al. (1998)'s finding that humor helped to decrease husbands' heart rates, and is consistent with other research noting that heart rate rises during humor-related behaviors such as laughter and some smiling (Ruch, 1993), implying that heart rate may drop after the laughter is over. In the Gottman study, it was the wives' humor which was significant, while in this study, the husbands'

own humor made the difference. It may be that the spouse initiating the humor is a function of the individual differences of the particular couples comprising these samples. Alberts (1990) noted that humor is not used in many conflict interactions, although it is likely to be an important conflict management tool when it does occur.

Another explanation for humor's preceding decreasing heart rate may be that humor may take more time to process cognitively than some other forms of communication (C. H. Tardy, personal email communication, April 19, 2002), because of the time needed to recognize the incongruity that is a part of humor (Ruch, 1993), and as a consequence the heart rates of husbands initiating humor may not decrease until they observe their wives responding appropriately to the humor.

Silence

Before moving into features that did not characterize decreasing heart rate, it should be noted that one of the most common behaviors during decreasing heart rate – silence – was excluded from the analysis because of interest in other behaviors. Silence by the person whose heart rate was changing occurred in 32.62% (SD = 15.71, range 0 - 56%) of the trends of decreasing heart rate, but these trends were intentionally not used as codable episodes, and no comparison was made of silence during trends of increasing heart rate.

FEATURES OCCURRING LESS OFTEN DURING DECREASING HEART RATE

The surprise element of this study was the large number of features that occurred significantly less often during episodes of decreasing heart rate, although

the literature had suggested that many of them were related to decreasing heart rate. These will be discussed in terms of their statistical significance in couples (across the sample) or separately in wives or husbands.

Couples' Discourse Features Occurring Less Often in Decreasing Heart Rate

Several behaviors by couples were more prevalent during increasing heart rate. Eye gaze and breaking eye contact, head nods, deep breaths, self-adaptors and illustrative gestures were more frequent during escalation.

Eye gaze

Both looking at the spouse and breaking eye contact were significantly more common during episodes of increasing heart rate. Furthermore, eye gaze tended to be more common during escalating episodes that were followed by decreasing heart rate, although the difference was not statistically significant. Eye gaze is an indication of immediacy and changes in eye gaze are linked theoretically to increases in arousal (LePoire, 1991). Kendon (1990) suggests that aversion of gaze is one way to reduce arousal, so it is possible that breaking eye contact occurs less often during decreasing arousal because there is less need for it then, while it occurs more frequently during increasing heart rate when a break from arousal is desired. More study is needed to tease out the relationship between heart rate and eye gaze.

Physical movement in head nods, self-adaptors, and illustrative gestures

Physical movement may explain why several factors appear more frequently in episodes of increasing heart rate. Head nods (and some acknowledgement tokens that involve nodding), self-adaptors, and illustrative

gestures are all active behaviors, and heart rate might be expected to increase in order to accommodate the additional movement (Rowell, 1986). As a consequence, although these features may relate to social support (Gerin et al., 1992), immediacy (LePoire, 1991) or other communication interests, additional physiological measures that are less sensitive to movement (e.g., skin conductance) will be needed to help determine their relationship to changing arousal.

Several of these behaviors are indicative of immediacy (LePoire & Burgoon, 1996), and might suggest an increase in attention which may, in turn, relate to changing heart rate. Eye gaze and illustrative gestures, possibly combined with other features such as head nods, may also be useful in eliciting attention during talk, since they are used in this way by patients trying to gain participation in talk by their physicians (Thompson, 1994). Such attempts by patients to gain attention seem quite likely to increase heart rate, but this has yet to be studied.

Deep breathing

Deep breathing was related to increasing heart rate in this study. This differs from previous research by Doussard-Roosevelt and Porges (1999), and from the expectations of Zeltzer & Feldman (1999) that deep breathing helps in self-soothing. However, it replicates Levenson's (1976) finding that increases in breathing depth parallel increases in heart rate. A feature that would have been more germane to this study would have been respiration rate, but respiration rate

data were not collected. Levenson found that slower rates of respiration corresponded to slower heart rate.

Summary sketch

Turning these cues of increasing heart rate into their counterparts, the picture of the nonverbal features of decreasing heart rate that emerges is one of partners who may not look at each other a great deal, but use normal breathing and keep their heads, hands, and bodies relatively still.

Wives' Discourse Features Occurring Less Often in Decreasing Heart Rate

Deep breaths were performed more often by wives during episodes when their husband's heart rates were increasing. Women are generally better decoders of nonverbal information than are men (Brody & Hall, 1993), so it may be that wives notice when their husbands are becoming physiologically aroused, and respond, metaphorically at least, by "holding their breath" until they see what their husbands will do. Wives may adopt a pattern of not speaking with certainty, and of not taking deep breaths during their husbands' increasing arousal.

Husbands' Discourse Features Occurring Less Often in Decreasing Heart Rate

Husbands whose heart rates are decreasing use few acknowledgement tokens and do not tend to respond neutrally to negative comments by their wives.

Acknowledgement tokens

Acknowledgement tokens, such as short vocalizations during eye gaze, or nonverbal cues such as head nods that let the speaker know that one is listening, occurred significantly more often during husbands' episodes of increasing heart

rate, and trended toward significance as a feature that precedes decreasing heart rate in husbands.

The lack of significance of acknowledgement tokens in the sample as a whole may not accurately reflect reality. Because this study focused primarily on episodes of changing heart rate that involved speech, acknowledgement tokens were underrepresented in the analyzed episodes. Further study is needed to understand how acknowledgement tokens relate to changing heart rate.

Responding neutrally

The feature of a neutral reply to a spouse's negative remark indexed the same behavior as Gottman et al.'s (1998) "de-escalation" of negative emotional affect. In the Gottman study, husbands who responded neutrally to their wives' negativity were more likely to experience a subsequent decrease in heart rate. In the present study, this result was not replicated. When husbands did respond neutrally to negative remarks, this was significantly related to episodes of increasing heart rate.

One possible reason for the difference in results is that Gottman et al. coded two different levels of negativity: high intensity and low intensity. Their finding was that husbands soothed themselves by not reciprocating low intensity negativity. In other words, being neutral when one's wife is slightly negative can be soothing. However, "it is characteristic of all marriages, even happy, stable ones, for people to reciprocate most negativity" (p. 18), and in this study reciprocation was common, while no distinctions were made between high and low intensity negativity.

It is possible that more high negativity remarks occurred in this study, and that many of the instances of neutral responses in this study were responses to high negativity. In these cases, Gottman et al.'s finding might not apply. Regardless, husbands in this study who attempted to de-escalate negative affect by their wives paid the price with higher heart rates. For couples who have a reservoir of goodwill and physiological stability, responding neutrally may offer rewards beyond the self-discipline and physiological arousal required. However, for distressed couples, responding neutrally may be both physiologically arousing and difficult to do emotionally (because reciprocation of negativity is so natural), and therefore untenable.

FEATURES NOT RELATED TO DECREASING HEART RATE

Several features were not related to decreasing heart rate. These included: expressing affection, prosody, and touch.

Expressing Affection

Expressing affection as an indicator of decreasing heart rate was derived from work in the Gottman lab. This study found only one instance of verbal expression of affection in the episodes of decreasing heart rate, so this variable was dropped from further analyses. However, Gottman et al. (1998) coded visual expressions of affection as well as verbal expressions, so the two coding schemes were not consonant on this feature.

It is somewhat surprising that expressing affection occurred only once during the 120 episodes of decreasing heart rate. At other times in the discussion, several couples expressed affection to one another, and several of these times

were sufficiently obvious to have been coded for this study. However, these expressions did not occur during the most profound de-escalations of heart rate that were used as episodes for analysis.

At least two couples touched affectionately or appeared that they would like to touch one another to express affection. The distance between chairs made such touching more difficult and may have made declamations of love more difficult as well. In addition, some couples may have felt awkward expressing affection in the lab setting. It is possible that expressing affection may be a potent soothing device in the right setting, but this study did not confirm this. Further study is needed to determine how expressing affection may or may not be related to decreasing aversive physiological arousal.

Prosody

None of the measures of prosody -- change in pitch, stammering/ stuttering, slower speech rate, unusual pauses, or a quieter voice -- reached significance in this study. This differed from Siegman, Dembroski and Crump's (1992) findings that slower, softer, and slower/softer speech related to decreasing heart rate. One of the major differences between their study and this one is that this study used speech that was naturally occurring in the service of a larger experiment, while their subjects knew that changes in prosody were the focus of their study. It is possible that their subjects varied their speech styles more dramatically than people typically do in conversation. If this is true, it is possible that Siegman et al.'s finding is theoretically interesting, but not likely to make much difference in "normal" conversation, unless people are trained to make

extreme changes in their volume and rate of speaking in order to alter their heart rates.

Touch

Touch – of partner or of self -- did not reach significance in this study, but the spacing of the chairs probably decreased the likelihood of some couples' touching each other during their discussions. The couples who did touch tended to make great efforts to do so, suggesting that touch is important in their relationships. Unfortunately, it is not clear how touch related to changing heart rate. Thus, this study does not further illuminate Nilsen and Vrana's (1998) or Lynch et al.'s (1980) comments on touch and heart rate.

DISCUSSION OF DISCOURSE ANALYSIS FINDINGS

The analysis of the exemplar episodes indicated that certainty, openness to another perspective, and gentleness characterized the episode of concurrently decreasing heart rate, while caution, and listening hard(ly) were the predominant features in the episode of simultaneously increasing heart rate. The differences in direct expressiveness versus careful tension in these two episodes were striking.

When coding "certainty" or "own perspective", a variety of cues interact to create the sense that one of these behaviors is present. One of the benefits of the discourse analysis was to offer a clearer understanding of the plethora of discourse features that go into making a judgment of "certainty" or any other category. These cues, ranging from prosody to word choice to gestures, offer a rich source of material for future research into the discourse of changing heart rate. Do different uses of pronouns, for example, typically occur during de-

escalating versus escalating arousal, as they did in the episodes analyzed for this study? Are extreme case formulations standard fare for decreasing heart rate, or do they also occur during increasing heart rate, and under what conditions? The detailed study of these elements of communication may hold the keys to identifying and eventually changing behaviors related to arousal. For couples who wish to modify their communication in relationship-enhancing ways, learning more about the discourse of changing heart rates could be valuable.

Due to the method used to select exemplar episodes, the couples in the episodes analyzed were experiencing the same type of change in heart rate (both decreasing or both increasing). This could be interpreted as physiological linkage. Levenson and Gottman (1983) found that couples who were more physiologically linked during discussion of a problem were less satisfied than others, and in their data, physiological linkage accounted for 60% of the variance in marital satisfaction (although Feeney, Noller, & Roberts [1998] note that these findings on physiological linkage have not been replicated). Levenson and Gottman believed that the physiological linkage occurred in the context of negative-affect expression and exchange (pp. 595-596), but their physiological data were not directional, so this is conjecture. However, in the context of the discourse analytic portion of this study, the two "physiologically linked" couples behaved in ways that illustrated many of the features of discourse that were statistically significant across the whole set of episodes. Although no generalizations can be drawn from the exemplar episodes, and this type of linkage was relatively rare (only eight "simultaneous" heart rate changes occurred in 240

episodes), it would be instructive to further explore the way that the physiological states of spouses interact, and to learn what sorts of interactive behaviors occur during spouses' similar versus differing levels of arousal.

LIMITATIONS

Every study has its limitations. In this study, one limitation was the artificial environment of the lab setting. Although the lab rooms themselves were ordinary classrooms, the addition of three videocameras, four computers, and other technological devices made them into settings that were probably different from those in which most couples usually engage in problem-solving discussions. In addition, some couples reported that the entire conflict scenario was not "normal" for them, and that they usually solve their differences in other ways. On the other hand, it is important to note that all of the couples did get involved in their conversations, and they habituated sufficiently to discuss their topics with vigor, as can be noted both by the discussions themselves and by their changing heart rates. In addition, studies using this method (i.e., Gottman lab) have resulted in findings which have predicted real-life events such as divorce (Gottman, et al., 1998).

Another limitation of the study is the exclusive use of heart rate data to index physiological arousal. As discussed earlier, physiological arousal is a complex, multidimensional response to a perceived stressor. This study focuses on only one indicator of that response. Because different physiological systems respond to stress in complementary ways, the addition of other indicators (e.g.,

skin conductance level) would provide a more complete picture of physiological arousal.

Sample size is another limitation of this study. Although the unit of analysis was the episode and there were a large number of episodes, using more than twelve couples might have generated a broader range of behaviors, with more generalizability to other populations.

In the study of something as complex as communication and psychophysiology, it is always difficult to disentangle what is really happening. Modulation of attention, processing time, and cognitive load are three of the factors which this study did not consider, but which are likely to be related to heart rate changes. When physical movements, conversation, cognition, emotion, and relationship phenomena are all occurring simultaneously, hard choices must be made concerning upon which aspects one should focus. This study focused on several features of discourse relevant to decreasing heart rate, and found significant results. In the future, other features could be employed to answer other questions and add puzzle-pieces to the overall picture that research is building in the area of marital communication.

METHODOLOGICAL SUGGESTIONS FOR FUTURE RESEARCHERS

Two suggestions derived from this study may be useful in refining the methodology of future research. The first suggestion concerns stimulated recall, while the second suggestion relates to the timing of behaviors and heart rate changes.

Stimulated Recall: Physiological Reliving?

This study's discovery that certainty relates to decreasing heart rate helps to explain a finding by researchers using the stimulated recall approach to studying marital conflict. Sillars, Roberts, Leonard, and Dun (2000), found that their couples used "subjective certainty" (p. 491) to unequivocally state the meaning of the conflict processes upon which they were reporting. Sillars, et al. expected their participants to physiologically relive the conflict, as Levenson and Gottman (1985) reported (after physiological measurement) that their couples did. However, Levenson and Gottman (also see Gottman, 1994) asked their couples to report on their affect during the experience, and offered a manual dial to turn in order to indicate how positive or negative they recalled their affect to have been for each moment they viewed. Reporting cognitions, and using words to make this report, is more likely to access the language (and logical, rather than emotional) portions of the brain, and less likely to create a situation in which physiological reliving will occur. Thus, it may be that Sillars et al.'s participants were experiencing post-conflict decreases in heart rate while describing the processes of their conflict, and these decreases in heart rate were reflected in the certainty with which they spoke. The actual physiological state of Sillars et al.'s participants is not measurable at this point, of course, but future research anticipating that participants will physiologically relive experiences should use physiological measures to support their claim. Eventually, the results of the present study and others yet to come may make it possible to use behavioral

assessment to bolster a claim for particular physiological processes occurring during recall, but that time is still in the future.

During or Preceding Decreasing Heart Rate?

There is a subtle, but very significant difference that is not often emphasized in the literature between features that occur during episodes of decreasing heart rate and those features that precede decreasing heart rate. Both can be called de-escalating or physiologically soothing. Many of the studies listing features related to decreasing heart rate measured these features during the decreasing heart rate (e.g., Siegman et al., 1992; Lynch et al., 1980). But Gottman et al. (1998) linked their SPAFF-coded behavior with their heart rate data in a manner that precluded analyses of the variety of behaviors occurring during episodes of decreasing heart rate. Their analyses focused on: 5 seconds pre-event, SPAFF-coded-event, 5 seconds post-event. The heart rate during the 5 seconds pre-event was compared with the heart rate during the 5 seconds post-event, and the SPAFF-code was considered significant only if the last 5 second trend showed a significant decrease in heart rate. This method does not control for the possibility that the decreasing heart rate was primarily related to silence or another factor, rather than to the coded behaviors, but the key point is that Gottman et al. only measured behaviors that preceded the decreases in the husband's heart rate. As a consequence, Gottman's findings regarding humor, acknowledgement tokens ("validation"), expressing affection, and responding neutrally to a negative remark by the spouse ("de-escalation" of negative affect) all relate to behaviors that precede decreasing heart rate. The differences between

features that precede changes in heart rate and those that occur during decreasing heart rate are important for future researchers to note.

FUTURE DIRECTIONS

A study of this nature has heuristic value, because it raises more questions than it answers. Some of the questions which should be addressed in future research include:

What Behaviors are Soothing?

The primary focus of the present study was on behaviors during decreasing heart rate. However, humor preceded decreasing heart rate, and similar trends were found for acknowledgement tokens, eyes toward spouse, head nods, and illustrative gestures. Future studies should investigate these features and others as possible features of soothing – features that help to create decreasing heart rate. It would be valuable to know what behaviors precede decreasing heart rate, because it is probably easier to teach someone discrete behaviors for soothing than it is to teach them to see another perspective, speak with utmost certainty, or be funny.

More Certainty about Certainty

As a relative newcomer on the research stage, certainty needs further investigation. Is seems likely that it may be related to potency, dominance, power, and/or directness, as well as to assurance (self and relational). For example, Feeney, Noller, and Roberts (1998) found that couples who experienced greater variability in IBI had a "greater sense of powerlessness" (p. 498). Their measure of power was a self-report questionnaire, so there is no way to directly

compare this study's performed certainty with their study's self-reported power. However, this leads to an important question: When heart rates are decreasing, do people feel more potent, more powerful, dominant, direct, self-assured, relationally-assured, comfortable, and/or okay than at other times? Is this mediated by marital satisfaction (as in the Feeney et al. study)?

Up to this point, the bias of researchers (e.g., Gottman, 1999; Zillmann, 1990, 1994) seems to have been to expect that powerful and negative feelings and behaviors related to increasing heart rate. This study complicates this view, since certainty is powerful and sometimes negative in tone. Further research is needed to understand how behaviors like certainty are related to various physiological substrates.

What is the Discourse of Increasing Heart Rate?

This study focused on the discourse of decreasing heart rate and, in the process, discovered some characteristics of increasing heart rate. Future research should include a focus on the discourse of increasing heart rate. Refinement and further development of theory relating physiology and communication await more understanding of their precise connections.

What about "Good" Listening?

What are the physiological correlates of listening? Does active listening have a different physiological pattern than do other types of listening? One of the surprises of this study was to see "good" listening behavior and psychologically "correct" talk (e.g., 6W) accompany physiological distress, while blunt, extremely confident expressions were indicative of decreasing heart rate. If the patterns

shown in these episodes prove widespread, it may be that what has been taught as "good" communication may not be so good for the communicator's health, since increased arousal is associated long-term with increases in physical morbidity and mortality (e.g., Burman & Margolin, 1992). Further research should re-examine "good" communication techniques with more knowledge and an understanding of the physiological tides running beneath the surface.

What Interactive Patterns Relate to Physiological Factors?

Neutral responses were related to increasing heart rate in these data, but to decreasing heart rate in Gottman's data. Are there other interactive patterns that may be directly related to physiological events? What sorts of conditions make a physiological-communication pattern more or less likely to occur?

What is the Role of Gender in Communication and Physiology?

Husbands had many more statistically significant results in this study than did wives. This complements the literature that indicates that gender differences are important in psychophysiology (e.g., Gottman et al., 1998; Gottman & Carrere, 1994). At a minimum, this demands separate analyses for men and women.

Studies are needed to continue to elucidate how different physiological responses by men and women relate to communication, and how this affects relationships. With research now suggesting that women's physiological reactions to stress may be different from men's (Taylor, Cousino-Klein, Lewis, Gruenewald, Gurung & Updegraff, 2000), what behaviors (and what physiological indicators) are best utilized for learning about women's experiences

during marital conflict? A new paradigm is particularly needed to understand how women soothe themselves, an area which generated no statistically significant results in the present study.

What Can We Teach People?

As we begin to understand the discourse of decreasing heart rate, it is important to find ways to value and appreciate the qualities that come into play when heart rate is decreasing. This may mean learning to see certainty in a conversational partner as a sign of physiological comfort, rather than as rudeness or aggressive behavior. Instead of teaching people to speak so cautiously, politely, and uncertainly (e.g. Notarius & Markman (1993), perhaps we should be teaching people how to decrease their heart rates enough to speak their mind AND demonstrate an openness to another's perspective. Further research is needed to determine what will be most helpful in teaching people how to manage their own arousal and recognize their partners' attempts to manage arousal during conflict.

Study of physiological differences throughout the lifespan is also needed. Arousal management skills should be taught when they are most readily learned – in childhood, but people deal with arousal at every age and it may differ in type or intensity at different stages of life. Clearly, people need the best understanding that science can provide as they seek to manage themselves, create healthy relationships with others, and behave as positive, responsible members of society as a whole.

This study has provided another small piece to place in the larger puzzle of how heart rate and communication connect. Findings in the area of relational

communication and physiology need to be integrated and made accessible to people who want to know how to how to improve their chances of maintaining healthy, happy relationships well into the future.

Appendix A: Consent Form

Consent Form
Marital Communication during Problem-solving Discussions

You are invited to participate in a study of marital communication. My name is Linda Crumley and I am a graduate student at The University of Texas at Austin in the Department of Communication Studies. This study is being conducted as a part of my dissertation. I hope to learn how married couples communicate when they are discussing problems together. You are being asked to participate in the study because of your expressed willingness to participate. If you participate, you will be one of approximately fifteen couples chosen to participate in this study.

If you decide to participate, I will ask you to: complete several questionnaires, participate in selecting topics to discuss with your spouse, wear a heart monitor, wear sensors on one hand , and have a videotaped 15-minute conversation with your spouse. The entire procedure will last no longer than two hours.

If you wish to skip a question or not talk about something that comes up during your discussion, you may do so. No treatment will be provided if you feel distressed by your discussion, but I do recommend that you call the Crisis Clinic Resource Network at 360-586-2800.

The heart monitor and sensors used in this study are used to help us understand what your body does during marital communication. The heart monitor is a belt around your chest. A female researcher or assistant will check the placement of the belt around your chest beneath the breast area. If you are uncomfortable with this procedure, please say so and an alternate procedure will be arranged. No treatment will be provided for research related injury and no payment can be provided in the event of a medical problem.

If your discussion generates reports of child physical or sexual abuse, or of threats to harm yourself or others, I am legally obligated to report this information to Child Protective Services or the local police department.

You will be videotaped during the study. The videotapes will be coded so that no personally identifying information is visible on them, and they will be kept in

a locked file cabinet in my office. They will be viewed only for research purposes, by myself and my associates, and will be retained for possible future analyses. Any information that is obtained in connection with this study that can be identified with you will remain confidential and will be disclosed only with your permission. Your responses will not be linked to your name in any written or verbal report of this research project.

You and your spouse will be given a book about marital communication as a "thank-you" for your participation in this study. This book will be yours even if you decide not to complete all of the study. At the conclusion of the study, you will be entered in a drawing to win a dinner for two at a nearby resort.

Your decision to participate or to decide not to participate will not affect your present or future relationship with The University of Texas at Austin or the Department of Communication Studies.

If you have any questions about the study, please ask me. If you any questions later, you may call me at (360) 426-2093, or you may call my supervisor, Professor Mark Knapp, Ph.D., at (512) 471-3787. If you have any questions or concerns about your treatment as a research participant in this study, call Professor Clarke Burnham, Chair of the University of Texas at Austin Institutional Review Board for the Protection of Human Research Participants at 512-232-4383.

You will be given a copy of this consent form for your records.

You are making a decision whether or not to participate. Your signature below indicates that you have read the information provided above and have decided to participate in the study. If you later decide that you do not want to participate in the study, simply tell me. You may discontinue your participation in this study at any time.

_____ _____

Printed Name of Participant Date Printed Name of Participant Date

_____ _____

Signature of participant Date Signature of participant Date

We may wish to present portions of some of the tapes from this study at scientific conventions or as demonstrations in classrooms. Please sign below if you are willing to allow us to do so with the tape of your performance.

I hereby give permission for the videotape made for this research study to be also used for educational purposes.

_____ _____

Signature of participant Date Signature of participant Date

_____

Signature of researcher Date

Appendix B: Questionnaires

CURRENT STATES QUESTIONNAIRE

Code: _____ Date: _____ **Wife** **Husband**

During the past three hours I: (Check all that apply)

smoked or chewed tobacco

drank caffeinated beverages (soda, coffee, tea)

ingested caffeine in another form (e.g., No-Doze, chocolate)

drank alcohol

used any other kind of drug (prescription or not)
what kind?

ate a heavy meal

exercised strenuously

DEMOGRAPHIC DATA

Code: _____ Date: _____ **Wife** **Husband**

Please provide the following information as it pertains to you and your family.

Your sex: ____Female ____Male
Your age: _____

Date of your wedding:
_____
Have you been previously married? Yes No
If yes, what were the dates of that marriage?
_____

Age and gender of children living in your home: _____
(e.g., Boy, age 7. Girl, age 10.)

Age and gender of children not living in your home:
_____

Your current
occupation:_____

Your highest level of education:
____ Some high school
____ High school degree or equivalent
____ Some college
____ College degree
____ Graduate coursework
____ Graduate degree

Your ethnic identity: _____

Your religious preference: _____

MARITAL OPINIONS QUESTIONNAIRE

Code: _____Date: _____ **Wife** **Husband**

We would like you to think about your married life over the last two or three months, and use the following words and phrases to describe it. For example, if you think that your marriage during the last two months has been very miserable, put an X in the space right next to the word "miserable." If you think it has been very enjoyable, put an X in the space right next to "enjoyable." If you think it has been somewhere in between, put an X where you think it belongs. PUT AN X IN ONE SPACE ON EVERY LINE.

miserable	___ ___ ___ ___ ___ ___ ___	enjoyable
hopeful	___ ___ ___ ___ ___ ___ ___	discouraging
free	___ ___ ___ ___ ___ ___ ___	tied down
empty	___ ___ ___ ___ ___ ___ ___	full
interesting	___ ___ ___ ___ ___ ___ ___	boring
rewarding	___ ___ ___ ___ ___ ___ ___	disappointing
doesn't give me much chance	___ ___ ___ ___ ___ ___ ___	brings out the best in me
lonely	___ ___ ___ ___ ___ ___ ___	friendly
hard	___ ___ ___ ___ ___ ___ ___	easy
worthwhile	___ ___ ___ ___ ___ ___ ___	useless

All things considered, how satisfied or dissatisfied have you been with your marriage over the last two or three months? Place an X in the space that best describes how satisfied you have been.

completely ___ ___ ___ ___ ___ ___ ___ completely
satisfied neutral dissatisfied

KNOX PROBLEM INVENTORY (GOTTMAN VERSION)

Code: _____ Date: _____ Circle one: Husband Wife

Knox Problem Inventory (Gottman Version)

Instructions: This form contains a list of topics that many couples disagree about. We would like to get some idea of how much you and your spouse disagree about each area.

In the first column, please indicate how much you and your spouse disagree by placing a number from 0-100. A zero indicates that you don't disagree at all and a 100 indicates that you disagree very much.

In the second column, please write down the number of years, months, weeks, or days that this has been an area of disagreement.

For example:

We disagree about ...	How much?	How long?
Alcohol and Drugs	90	2 ½ years

This indicates that alcohol and drugs are something you disagree very much about and it has been a problem for about 2 and ½ years.

We disagree about ...	How much?	How long?
1. Money		
2. Communication		
3. In-laws		
4. Sex		
5. Religion		
6. Recreation		
7. Friends		
8. Alcohol and Drugs		
9. Children and/or Grandchildren		
10. Jealousy		

Please write down any other areas of disagreement

11. _____

12. _____

Appendix C: Laboratory System Components

Six systems interacted to form the laboratory. Each will be described below:

POLAR ADVANTAGE RECEIVING SYSTEM

Each person had a Polar Advantage Receiver, consisting of a black wallet-sized box which hung over the participant's shoulder on the side farthest from their spouse. Each receiver was linked to a computer running the Polar Precision Performance Software for Windows, Version 2 that collect and record data from the Polar T61 coded transmitter belt. The computers used for this purpose were a Hewlett Packard laptop computer and a Toshiba laptop computer.

THOUGHT DYNAMICS RECEIVING AND DISPLAY SYSTEM

Each person had a "rabbit's foot" receiving device enclosed in soft gray fabric and suspended from their neck by a wide ribbon. The "rabbit's foot" devices were linked to the notebook-sized Thought Dynamics receivers, each of which, in turn, were linked both to a computer and to the central black Thought Dynamics display box. The computers used for this purpose were a Compaq laptop computer and a Dell computer with full-sized case, keyboard, and Sony monitor. Telix (a terminal emulation program) was used to also record data from the Polar transmitter belt.

MICROPHONE SYSTEM

Lavalier miniature-sized microphones (Audio-technica ATR35s) were clipped to the ribbon or shirt of participants. The microphone cables were attached to a central cable which connected with the main (Sony) videocamera. Headphones were used to test microphone function at the videocamera.

EXTERNAL VIEWING SYSTEM

A small television was used to monitor the experiment from outside of the room. This system included the television, its power box, and cables linking it to the main (Sony) videocamera. The television was placed just outside of the lab room, and the volume was turned off while the couple was having their discussion.

VIDEO SYSTEM

Three videocameras were used to record the lab session from the time they entered the staging area. The main camera was a Sony digital videocamera. It was used to focus on the couple on the stage. Because its tape capacity was limited, it was turned on only during both physiological baseline sessions and during the discussion itself. A large Bogen tripod was used to maintain a steady shot. The Sony was attached to the couple's microphones, to the external television, and to a set of headphones used to test the microphones' function.

The second videocamera used VHS format, and also had a large tripod. This camera focused exclusively on the individual sitting in the right-hand chair on the stage. It was turned on prior to the closed-eyes baseline and remained on until the discussion was over.

Two cameras were used as the third videocamera. For the first part of the study, another VHS camera with a medium-sized tripod was used. When its owner needed it back, a Canon Hi-8 camera with a small tripod was substituted. The third camera focused exclusively on the individual sitting in the left-hand chair on the stage. It was turned on prior to the closed-eyes baseline and remained on until the discussion was over.

HOSPITALITY SYSTEM

The hospitality system included the stage area and questionnaire/monitor areas. The stage area was created by attaching several yards of gray fabric to free-standing room dividers (at the college) or to the wall (at the church) to form a backdrop for the couple when they sat in the two chairs.

The questionnaire area included a table, two chairs, a clipboard for each individual with the consent forms and questionnaires attached, pens, water glasses and a pitcher filled with ice water, the Polar T61 coded transmitter belts, and a spray bottle of water to use when applying the transmitter belts.

Appendix D: Decreasing Heart Rate Trends Analyzed

DECREASING HEART RATE TRENDS ANALYZED IN THIS STUDY

Person	Heartbeats in hexadecimal	IBI Change	Length in msec
D001C HUSBAND	3BC-3C4	619-882=263	6635
D001C HUSBAND	3C9-3CF	663-891=228	5286
D001C HUSBAND	52E-535	682-913=231	6214
D001C HUSBAND	571-578	568-851=283	5587
D001C HUSBAND	5F6-5FC	649-913=264	5420
D001C WIFE	222-229	681-879=198	6174
D001C WIFE	2A3-2A9	690-830=140	5403
D001C WIFE	4CF-4D6	705-878=173	6197
D001C WIFE	4D9-4E2	678-807=129	7733
D001C WIFE	51A-520	668-839=171	5333
D002C HUSBAND	1474-147C	589-667=78	5628
D002C HUSBAND	151B-1528	578-652=74	8483
D002C HUSBAND	154E-1558	573-701=128	6683
D002C HUSBAND	15C3-15CB	561-659=98	5397
D002C HUSBAND	15EA-15F5	575-710=135	7476
D002C WIFE	105A-1061	614-752=138	5451
D002C WIFE	1146-114C	635-862=227	5055
D002C WIFE	11A9-11B5	621-796=175	9326
D002C WIFE	124B-1252	643-822=179	5754
D002C WIFE	12E1-12E8	590-753=163	5315
D003C HUSBAND	AB5-ABD	704-873=169	7080
D003C HUSBAND	AFF-B07	819-1014=195	8446
D003C HUSBAND	B9C-BA2	919-1075=156	6958
D003C HUSBAND	CCF-CDF	779-1012=233	5582
D003C HUSBAND	D0B-D11	922-1090=168	6977

D003C WIFE	DFE-E05	718-867=149	6273
D003C WIFE	E2E-E34	685-806=121	5187
D003C WIFE	EE3-EE9	695-783=88	5155
D003C WIFE	EEA-EF3	759-866=107	7927
D003C WIFE	F1D-F25	705-830=125	6800
D004C HUSBAND	1005-100A	831-1001=170	5515
D004C HUSBAND	1027-1033	836-1053=217	12130
D004C HUSBAND	132E-1334	795-1015=220	6270
D004C HUSBAND	1365-136A	774-957=183	5201
D004C HUSBAND	1381-1387	831-1001=170	6542
D004C WIFE	11E9-11EF	704-856=152	5448
D004C WIFE	1202-120B	693-872=179	7971
D004C WIFE	1214-121A	669-937=268	5643
D004C WIFE	1493-1499	768-938=170	5755
D004C WIFE	15CE-15D5	721-890=169	6471
D006C HUSBAND	120C-1216	696-986=290	9000
D006C HUSBAND	1253-1258	834-1142=308	6165
D006C HUSBAND	12CD-12D2	783-1171=388	5859
D006C HUSBAND	12D4-12D9	940-1284=344	5595
D006C HUSBAND	15FC-1601	884-1229=345	5888
D006C WIFE	BBD-BC3	755-1036=281	6096
D006C WIFE	CF2-CFB	689-983=294	8401
D006C WIFE	D5E-D64	753-867=114	5733
D006C WIFE	E79-E7E	783-911=128	5107
D006C WIFE	E83-E88	785-948=163	5065
D007C HUSBAND	D8D-D92	910-1102=192	6161
D007C HUSBAND	DA3-DAE	838-1183=345	11675
D007C HUSBAND	ECA-ECF	746-1074=328	5674
D007C HUSBAND	F04-F0B	820-1056=236	7639
D007C HUSBAND	F6B-F6F	909-1124=215	5050
D007C WIFE	1178-117E	829-1135=306	6653
D007C WIFE	118F-1194	992-1260=268	5512
D007C WIFE	11C9-11CD	927-1158=231	5144
D007C WIFE	1248-124D	899-1139=240	6079
D007C WIFE	129F-12A5	829-1241=412	7156

D008C HUSBAND	12DB-12E3	595-827=232	6445
D008C HUSBAND	12F2-12F8	624-984=360	5524
D008C HUSBAND	15E3-15E9	714-957=243	5850
D008C HUSBAND	1680-1692	605-872=267	14215
D008C HUSBAND	16B0-16B5	793-1044=251	5390
D008C WIFE	152F-1535	649-860=211	5361
D008C WIFE	15CE-15D4	617-805=188	5001
D008C WIFE	180C-1816	651-760=109	7696
D008C WIFE	195C-1965	671-810=139	7619
D008C WIFE	19A1-19A8	642-826=184	6041
D010C HUSBAND	1A8E-1A96	637-946=309	7109
D010C HUSBAND	1BD1-1BDC	581-881=300	8537
D010C HUSBAND	1BEB-1BF1	630-860=230	5107
D010C HUSBAND	1C3E-1C45	584-848=264	5650
D010C HUSBAND	1C64-1C6E	617-838=221	7549
D010C WIFE	1986-198D	595-758=163	5396
D010C WIFE	19EE-19F4	582-895=313	5087
D010C WIFE	1A83-1A89	713-878=165	5543
D010C WIFE	1B8E-1B94	631-877=246	5159
D010C WIFE	1D3E-1D47	579-723=144	6414
D012C HUSBAND	111B-1122	768-994=226	7048
D012C HUSBAND	11FD-1202	781-919=138	5199
D012C HUSBAND	1228-1231	735-919=184	8037
D012C HUSBAND	139B-13A0	801-950=149	5252
D012C HUSBAND	1481-1486	784-969=185	5280
D012C WIFE	10F0-10F7	635-986=351	6430
D012C WIFE	10FC-1101	727-1013=286	5167
D012C WIFE	114F-1155	741-1012=271	5976
D012C WIFE	1164-116C	697-1029=332	7816
D012C WIFE	11BF-11C6	715-988=273	6677
D013C HUSBAND	1E62-1E69	613-757=144	5361
D013C HUSBAND	1E70-1E77	594-838=244	5482
D013C HUSBAND	1FBA-1FC1	525-773=203	5333
D013C HUSBAND	1FC8-1FCF	603-747=144	5255
D013C HUSBAND	217E-2188	546-703=157	7002

D013C WIFE	18DB-18E5	523-960=437	7170
D013C WIFE	1A5F-1A67	640-911=271	7063
D013C WIFE	1C07-1C0E	659-980=321	5878
D013C WIFE	1C47-1C50	673-1008=335	8751
D013C WIFE	1C5F-1C66	677-1003=326	6484
D014C HUSBAND	16AC-16B5	622-821=199	7026
D014C HUSBAND	16F5-16FB	661-827=166	5157
D014C HUSBAND	187E-1885	581-781=200	5374
D014C HUSBAND	18D6-18DD	564-813=249	5158
D014C HUSBAND	1A48-1A51	620-803=183	7130
D014C WIFE	FDB-FE1	742-1036=294	5910
D014C WIFE	116D-1172	773-959=186	5090
D014C WIFE	1178-117E	822-1054=232	6744
D014C WIFE	1217-121C	760-1000=240	5256
D014C WIFE	12F0-12F7	745-1014=269	6712
D015C HUSBAND	10E0-10E7	703-873=170	6387
D015C HUSBAND	1113-1125	593-870=277	13750
D015C HUSBAND	13FC-1401	795-888=93	5065
D015C HUSBAND	143A-1443	729-816=87	7723
D015C HUSBAND	1491-1497	757-866=109	5739
D015C WIFE	1072-1077	796-986=190	5234
D015C WIFE	10C3-10CA	683-919=236	6426
D015C WIFE	1147-114D	721-1009=288	5779
D015C WIFE	1228-122D	732-944=212	5044
D015C WIFE	1402-1407	766-1005=239	5137

Appendix E: Coding Schemes and Coding Manuals

CODING SCHEME, VERSION 3

Episode Code: _____
Focusing on: Wife Husband (Circle One)

Code one participant at a time. Check each time a behavior occurs during the episode.

Prosody

Slower speech rate
Quieter speech amplitude

Physical Cues

Change in eye contact
Head nod
Touch partner
Touch self

Content

Humor (both partners smile or laugh, tone of happiness)
Neutral remark that follows partner's negative remark
Express affection for partner
Acknowledgement token/Backchannel

Coder Initials: _____

CODING MANUAL FOR VERSION 3

Code one participant (P) at a time. Check each time a behavior occurs during the episode.

Prosody

Slower speech rate: Is there an obvious change in how fast P is talking? Use this code when P changes the whole rate of their talk to slower for at least a phrase or longer. Do NOT use it for ordinary pauses inserted into talk that occurs at P's usual rate. Use it for talk that slows obviously (and may include awkward pauses), such as that when P is searching for what to say. Also use it for talk that becomes slow in order to emphasize a point.

Quieter speech amplitude: Does P talk more quietly than usual? A softer voice is coded here, but only if it marks a change from P's normal loudness.

Physical Cues

Change in eye contact: Does P appear to make or break sustained eye contact with their partner? Do NOT code short shifts in gaze that feel ordinary during conversation. Code changes in eye contact in which P focuses their eyes on their partner for a time and the partner appears to return their gaze. Code changes when P definitely directs their gaze away from their partner after have had eye contact with them. Code series of short gaze shifts that seem to be out of the ordinary.

Head nod: Does P's head nod during the conversation? Code nods that are communicative in nature. Some head nods of this sort function to: signify that P is listening, or that P agrees with the partner, or that P wants to keep the floor while talking, or that P wants to emphasize a particular point, etc. Do NOT code head movements which appear to be the result of stretching or ordinary changes in posture.

Touch partner: Does P touch their partner? Code any physical contact.

Touch self: Does P touch him/herself? Code repetitive self-touching such as twiddling thumbs, playing with hair, stroking hands, rubbing a limb.

Content

Humor: Do both partners smile or laugh or otherwise convey that they think something is funny? Code only humor that has a tone of happiness. Do NOT code humor that has an undercurrent of hurtfulness to each other. Humor must be shared by both partners. It may include such things as jokes, good-natured teasing, giggling, nonsense speech, fun, exaggeration, recognizing absurdity, wit, and we-against-other laughter.

Neutral remark that follows partner's negative remark: When the partner makes a negative remark, does P respond in a neutral (non-negative, non-positive) way? This code can include simply not retaliating in kind to a barb; P's verbal response and affect may not be positive, but they MUST NOT be negative.

Express affection for partner: Does P signal affection to their partner? Code verbal or nonverbal signals that communicate "I care about you." "You are special to me." "I love you."

Acknowledgement tokens: While looking at the partner, does P say "uh-huh," or make other noises or nonverbal signals that mean "I'm listening" or "I am tracking the conversation"? Does P repeat short segments of their partner's talk to encourage them to continue talking?

CODING SYSTEM 5

Coding System 5 **Observation Section** Couple: D0_____C
Date_____ Coder_____ Heart Rate is Changing in: Husband Wife
Now Coding: Husband Wife
Episode: De-esc. Training Escalating Episode: _____ - _____
Rate: 4=Strongly agree, 3=Agree, 2=Neutral, 1=Disagree, 0=Strongly Disagree

Physical Cues

Eyes: (p. 3) Order of Events:
_____ continue making eye contact _____
_____ make new eye contact _____
_____ continue not making eye contact _____
_____ break eye contact _____
_____ gaze at spouse _____
_____ other: _____ _____
Deep breath: (p. 6) Also note ____ if in context clip.
_____ inhale
_____ exhale
_____ yawn
Gestures/Movements
_____ Illustrative/descriptive of words
_____ Adaptive _____
_____ General_____
_____ Repetitive (code with one or more of above)
Head : (p. 3)
_____ Nod
_____ Other _____
Touch
_____ Touch partner (p. 3)
_____ Touch self (p. 5)

Prosody

_____ Change in pitch (high? low?) (p. 5)
_____ Stammering/stuttering (p. 5)
_____ Slower speech rate (p. 2)
_____ Quieter voice (p. 2)
_____ Other _____
Other (p. 3)

Coding System 5 **Content Section** Couple: D0_____C
Date_____ Coder_____ Heart Rate is Changing in: Husband Wife
Now Coding: Husband Wife
Episode: De-esc. Training Escalating Episode: _____ - _____
Rate: 4=Strongly agree, 3=Agree, 2=Neutral, 1=Disagree, 0=Strongly Disagree

Content

_____ Accept own responsibility in a relational problem
_____ Agree with spouse
_____ Acknowledgement token/Backchannel
_____ Ask new-information question
_____ Change topic

_____ Explain something outside of the relationship
_____ Express affection for partner
_____ Humor (both partners smile or laugh, tone of happiness)
Also note _____ if humor occurs in context clip.
_____ Meta-talk about relationship
_____ Paraphrase spouse's words/meaning (before adding own comments)

Language use: (p. 5)
_____ Conclusion ("so," "well," "because"…)
_____ Certainty ("always," "never," "it's wrong!", tone)
_____ Directive ("you should")

_____ Feeling words ("I feel," "it's hard" …) related to emotion
_____ List several items
_____ Offer own perspective ("I think" "to me" …)

_____ Tentative language ("maybe," "if," "possibly," "might," …)
_____ "We" language ("us," "our"…)
_____ "You know," "you know what I mean" or similar phrase

Spouse made negative remark prior to or at beginning of episode Yes No
_____ Person responds to spouse's negative remark with neutral affect

CODING MANUAL FOR CODING SYSTEM VERSION 5
(This version was used to code episodes of decreasing heart rate)

Complete Top Section:

Coding System 5 **Section Title** Couple: D0_____C
Date_____ Coder_____ Heart Rate is Changing in: Husband Wife
Now Coding: Husband Wife
Episode: De-esc. Training Escalating Episode: _____-_____
Rate: 4=Strongly agree, 3=Agree, 2=Neutral, 1=Disagree, 0=Strongly Disagree

Instructions:
Couple: D0_____C Fill in the two-digit code applicable to the couple being coded (e.g., 01, 02, 15)

Date: Fill in today's date

Coder: Fill in your initials

Heart Rate is Changing in: Circle the person whose title is included in the title slide.

Now coding: Circle the person you are watching and coding on this paper. The person whose heart rate is changing MAY be DIFFERENT from person you are coding, since both partners are being coded for every episode. Code one participant (P) at a time.

Episode: Circle if this is a
De-escalating episode (title slide has HUSBAND or WIFE at top)
Training episode (title slide starts with TRAINING)
Escalating episode (title slide starts with ESCALATING)

Episode begins at: Fill in the two hexadecimal numbers near the end of the title slide. These numbers can be viewed in the black display box during the episode. Check often to be sure you're coding the right episode!

Rate: Rate each of the listed behaviors in the episode, using the following scale:
4 = Strongly agree = I definitely observed this behavior. Note briefly what you observed.
3 = Agree = I observed this behavior. Note briefly what you observed.
2 = Neutral = It was hard to tell if this behavior was present or not.
1 = Disagree = This behavior was not present in this episode.
0 = Strongly disagree = This behavior was definitely not present in this episode.

Complete Observation Section:

Physical Cues

Eyes:	Order of Events
_____ continue making eye contact	_____
_____ make new eye contact	_____
_____ continue not making eye contact	_____
_____ break eye contact	_____
_____ gazes at spouse	_____
_____ other: _____	_____

What sort of eye contact occurs in this episode? Do NOT code short shifts in gaze that feel ordinary during conversation.
Code making eye contact during times in which P focuses his/her eyes on their partner for a time and the partner appears to return their gaze. This may be continuing from a time before the episode begins, or may occur newly during the episode.
Code "continue not making eye contact" when the episode begins with P not making eye contact with the partner, and P continues this behavior.
Code "break eye contact" when P definitely directs their gaze away from the spouse after having had eye contact or after gazing at spouse.
Code "gazes at spouse" when P seems to be looking for eye contact, even if s/he is not successful.
Code "other" for such things as: looking down, eye rolls, shifting eyes from side to side, looking around the room, etc.
More than one type of eye contact may occur during an episode. When more than one type of eye contact occurs, list the order in which they changes occur, along with brief notes of the behaviors you observe (e.g., when H says "we have different views," W makes new eye contact).

Deep breath: Also note _____ if in context clip.
_____ inhale
_____ exhale
_____ yawn

Does P take an obvious deep breath, or does P yawn during the context clip? If so, note what happened, rate the strength of the breath or yawn and check that it occurred in the context clip.
Does P inhale obviously, taking a deep breath that is obvious on the videotape? Signals may include the sound of P's inhalation, probably accompanied by a change in posture (e.g., shoulders up or chest lifts and expands). Code breaths that seem unusually deep and are obvious. Do NOT code breaths that seem to be part of P's normal respiration.

Does P exhale obviously? This may sound like a sigh, or a hiss, depending on the speed and force of exhalation. Again, code breaths that seem unusually deep and are obvious. Do NOT code breaths that seem to be part of P's normal respiration.

Does P yawn during this episode?

Gestures/Movements
_____ Illustrative/descriptive of words
_____ Adaptive _____
_____ General
_____ Repetitive
Does P use hands, head, general body, face, or otherwise gesture in a way that helps illustrate what his/her words are saying? Do we understand the statement more fully because of descriptive gestures?

Does P seem to be uncomfortable and perform a gesture that seems intended to relieve the discomfort (e.g., scratching, twisting head/neck to relieve tension). Also code gestures/movements that function primarily as a way to relieve nervousness, UNLESS these involve self-touch (in which cases, code as touch self). Please note what behavior you are coding as adaptive. Drinking water is generally considered adaptive.

Does P make other gestures that generally do not fit the above categories, but help to communicate the message (versus relieve discomfort)?

Are P's gestures (of any type) repeated more than once in the episode? Also code repetitive head nods, other repetitive head movements, and repetitive touches here. Use an arrow to note which movement is being coded as repetitive.

Head :
_____ Nod
_____ Other _____
Does P nod their head in a communicative fashion during the episode? Some head nods of this sort function to: signify that P is listening, or that P agrees with the partner, or that P wants to keep the floor while talking, or that P wants to

emphasize a particular point. Do NOT code head movements which appear to be the result of stretching or ordinary changes in posture.

Does P perform some other movement with their head (e.g., shake head, pull it back sharply, thrust it forward, …)? Code smaller head and facial movements as illustrative gestures when they help to illustrate a message. Specify what you observe.

Touch

_____ Touch partner

_____ Touch self

Does P touch their partner? Code any physical contact to the partner initiated by P.

Does P touch him/herself? Code repetitive self-touching such as twiddling thumbs, playing with hair, stroking hands, rubbing a limb (and note it as repetitive, below). Also code non-repetitive self-touching such as laying a hand on a knee while making a gesture. Do NOT code continuing to keep hands together without movement, or keeping arms folded without movement. Code as adaptive, self-touches that are NOT primarily to relieve nervousness, but ARE primarily adaptive (intended to relieve physical discomfort).

Prosody

_____ Change in pitch (high? low?)

Does P's voice change – either going markedly higher or lower – during this episode? Code changes in overall voice (e.g., voice is markedly higher than normal), as well as definite pitch changes during the conversation. Please circle if the voice goes higher or if it becomes lower, and briefly note the words accompanying such changes.

_____ Stammering/stuttering

Does P repeat words or sounds as if s/he is having a hard time getting them out?

_____ Slower speech rate

Is there an obvious change in how fast P is talking? Use this code when P slows down the whole rate of their talk for at least a phrase or longer. Use it for talk that becomes slow in order to emphasize a point, etc.

Also use this code for awkward pauses, or extended pauses such as when P is searching for what to say. Do NOT use it for ordinary pauses in talk that seem to reflect P's usual rate.

_____ Quieter voice

Does P talk more quietly than usual? A soft voice is coded here only if it marks a CHANGE from P's normal loudness.

Other
Note anything else you feel may be of importance in understanding this episode.

Complete Content Section:

Complete Top Section as shown above.

Content

_____ Accept own responsibility in a problem
Does P verbally acknowledge their own part in the problem being discussed? Does P take responsibility for their role in the problem? Code this when P seems to: (1) understand the problem, (2) see his/her role in the problem (i.e., does not blame spouse for the whole problem), AND (3) be agreeable to helping solve the problem.

_____ Agree with spouse
Does P agree with the partner? This may be shown verbally or with a combination of verbal and nonverbal signals. Do NOT code signals that seem to mean "I am listening." Only code signals that seem to be saying "I agree with you about that." Do NOT code "Yes, but" statements in which the "yes" portion is really only a preface to the disagreement in the "but" statement.

_____ Acknowledgement token/Backchannel
Does P say "uh-huh," or make other noises or nonverbal signals while the spouse is talking, that mean "I'm listening" or "I am tracking the conversation"? Also code head nods that indicate that listening is happening.

_____ Ask new-information question
Does P ask the spouse a question which seems intended to elicit information that P does not already have? Do NOT code rhetorical questions (in which P already knows the answer).

_____ Change topic
Does P suggest that they change the topic, introduce a new topic, or collaborate eagerly if the spouse proposes a new topic?

_____ Explain something outside of the relationship

Does P explain something objective or fact-oriented? Do NOT code personal explanations of how P feels/is as a person.

_____ Express affection for partner
Does P signal affection to their partner? Code verbal or nonverbal signals that clearly communicate "I care about you." "You are special to me." "I love you."

_____ Humor (both partners smile or laugh, tone of happiness)
Do BOTH partners smile or laugh or otherwise convey that they think something is funny? Code only humor that has a tone of happiness. Do NOT code humor that has an undercurrent of hurtfulness. Note whether the humor occurred in the episode, in the context clip, or in both.

_____ Meta-talk about relationship
Does P talk about the couple's relationship as an object? Examples include: "I think our marriage is going well." "How do you feel about our relationship?" Code talk that treats the relationship as something "out there," rather than as part of the current interaction.

_____ Paraphrase spouse's words/ meaning (before adding own comments)
Does P repeat short segments of their partner's talk. either word-for-word or very nearly so? Does P reiterate or rephrase the spouse's meaning before saying anything new?

Language use:
_____ Conclusion ("so," "well," "because" …)
Does P say "so" or otherwise either offer a conclusion or ask the spouse to offer a summation of the point?

_____ Certainty ("always," "never" "it's wrong!" tone)
Does P use words or a tone that express full confidence that what s/he is saying is absolutely correct? Code statements that P delivers as un-questionable. Also code words that are given an extra weight of certainty by the way they are delivered. Do NOT code statements that are "only my own perspective."

_____ Directive ("you should")
Does P tell the spouse what to do? Does P issue a command? Code when the tone is imperative – (you/we/I/they) (have to/must/should) do this.

_____ Feeling words ("I feel," "it's hard," or something similar) related to emotion

Does P express a feeling in words? Do not code "I feel" statements that really mean "I think." Code all statements that verbally state emotions.

_____ List several items
Does P make a listing of three or more items or incidents?

_____ Own perspective ("I think" "… to me" …)
Does P share his/her own perspective on the matter, implying that s/he realizes that the spouse may or may not agree with this perspective? Does P suggest that this is "only my opinion," or may be true only "for me"? Do NOT code BOTH certainty and own perspective.

_____ Tentative language ("maybe," "if," "possible," "might," "like," …)
Does P use that avoid making a statement sound too definite? Does P formulate statements as questions?

_____ "We" language ("us," "our" …)
Does P use words that treat the couple as an entity?

_____ "You know" or "you know what I mean" or similar phrase
Does P say "you know" or a similar phrase suggesting that the spouse already agrees with him/her?

Spouse made negative remark prior to or at beginning of episode Yes No
_____ Person responds to spouse's negative remark with neutral affect
Review the episode, context, or (if necessary) preceding video to determine if the spouse's latest remark (or obvious nonverbal communication)has a negative tone. Circle Yes or No.

If Yes, code how P responds IN THIS EPISODE to the spouse. When the partner's preceding remark has a negative tone or content, does P respond in a neutral (non-negative, non-positive) way? This code can entail simply not retaliating in kind to a barb; P's verbal response and affect may not be positive, but they MUST NOT be negative. Use the following rating scale for how neutral/positive P's response is, in this episode: 4=Strongly agree 3=Agree 2=Neutral 1=Disagree 0=Strongly disagree.

CODING SYSTEM 6

Coding System 6 **Observation Section** Couple: D0_____C
Date_____ Coder_____ Heart Rate is Changing in: Husband Wife
Now Coding: Husband Wife
Episode: De-esc. Training Escalating Episode: _____ - _____
Rate: 4=Definitely Present 3=Present 2=Neutral 1=Absent 0=Definitely Absent

Physical Cues

Eyes: (p. 2) Order of Events:
_____ toward: make eye contact, gaze at spouse _____
_____ continue not making eye contact _____
_____ break eye contact _____
_____ other _____ _____

Deep breath: (p. 2) Also note ____ if in context clip.
_____ inhale
_____ exhale

Gestures/Movements (p. 3)
_____ Illustrative/descriptive of words
_____ Adaptive
_____ Touch self

Head : (p. 3)
_____ Nod
_____ Shake head
_____ Other _____
_____ Repetitive (code with one or more of above) (p. 3)

Prosody

_____ Change in pitch (high? low?)
_____ Stammering/stuttering
_____ Slower speech rate, unusual pauses
_____ Quieter voice
_____ Other _____

Other (p. 4)

Coding System 6 **Content Section** Couple: D0_____C
Coder_____ Heart Rate is Changing in: Husband Wife
Now Coding: Husband Wife
Episode: De-esc. Training Escalating Episode: _____ - _____
Rate: 4=Definitely Present 3=Present 2=Neutral 1=Absent 0=Definitely Absent

Content

_____ Accept own responsibility in a relational problem
_____ Agree with spouse
_____ Acknowledgement token/Backchannel
_____ Ask new-information question
_____ Change topic

_____ Explain something outside of the relationship
_____ Humor (both partners smile or laugh, tone of happiness)
Also note _____ if humor occurs in context clip.

Language use: (p. 6)

_____ Conclusion ("so," "well," "because"…)
_____ Certainty ("always," "never," "it's wrong!", tone)
_____ Directive ("you should")

_____ Feeling words ("I feel," "it's hard" …) related to emotion
_____ List several items
_____ Only my perspective ("I think" "to me" …)

_____ Tentative language ("maybe," "if," "possibly," "might," …)
_____ "We" language ("us," "our"…)
_____ "You know," "you know what I mean" or similar phrase

Spouse made negative remark prior to or at beginning of episode Yes No
_____ If Yes, Person responds to spouse's negative remark with neutral affect

CODING MANUAL FOR CODING SYSTEM VERSION 6
(This version was used to code episodes of decreasing heart rate)

Complete Top Section:

Coding System 6 **Section Title** Couple: D0_____C
Date_____ Coder_____ Heart Rate is Changing in: Husband Wife
Now Coding: Husband Wife
Episode: De-esc. Training Escalating Episode: _____-_____
Rate: 4=Definitely Present 3=Present 2=Neutral 1=Absent 0=Definitely Absent

Instructions:
Couple: D0_____C Fill in the two-digit code applicable to the couple being coded (e.g., 01, 02, 15)

Date: Fill in today's date

Coder: Fill in your initials

Heart Rate is Changing in: Circle the person whose title is included in the title slide.

Now coding: Circle the person you are watching and coding on this paper. The person whose heart rate is changing MAY be DIFFERENT from person you are coding, since both partners are being coded for every episode. Code one participant (P) at a time.

Episode: Circle if this is a
De-escalating episode (title slide starts with HUSBAND or WIFE at top)
Training episode (title slide starts with TRAINING)
Escalating episode (title slide starts with ESCALATING)

Episode begins at: Fill in the two hexadecimal numbers near the end of the title slide. These numbers can be viewed in the black display box during the episode. Check often to be sure you're coding the right episode!

Rate: Rate each of the listed behaviors in the episode, using the following scale:
4 = Definitely present = I definitely observed this behavior. Note briefly what you observed.
3 = Present = I observed this behavior. Note briefly what you observed.
2 = Neutral = It was hard to tell if this behavior occurred or not.
1 = Absent = This behavior was not present in this episode.
0 = Definitely Absent = This behavior was definitely not present in this episode.

Complete Observation Section:

Physical Cues

Eyes: (p. 3)	Order of Events:
_____ toward: make eye contact, gaze at spouse	_____
_____ continue not making eye contact	_____
_____ break eye contact	_____
_____ other _____	_____

What sort of eye contact occurs in this episode? Do NOT code short shifts in gaze that feel ordinary during conversation.

Code "toward" when P is looking toward spouse, either making eye contact or gazing at spouse. Making eye contact occurs when P focuses his/her eyes on their partner for a time and the partner appears to return their gaze. This may be continuing from a time before the episode begins, or may occur newly during the episode. Gazing at spouse occurs when P looks at spouse, and seems to be looking for eye contact, even if eye contact does not occur.

Code "continue not making eye contact" when P is not making eye contact (and not gazing at spouse), such as when P enters the episode while not making eye contact with the partner.

Code "break eye contact" when P breaks eye contact, directing their gaze away from the spouse after having had eye contact or after gazing at spouse.

Code "other" for such things as: looking down, eye rolls, shifting eyes from side to side, looking around the room, etc. Specify what you observe.

More than one type of eye contact may occur during an episode. When more than one type of eye contact occurs, list the order in which they changes occur, along with brief notes of the behaviors you observe (e.g., when H says "we have different views," W makes new eye contact).

Deep breath: Also note _____ if in context clip.
_____ inhale
_____ exhale
Does P take an obvious deep breath (or yawn) during the context clip? If so, note what happened, rate the strength of the breath or yawn and check that it occurred in the context clip.

Does P inhale obviously, taking a deep breath that is obvious on the videotape? Signals may include the sound of P's inhalation, probably accompanied by a change in posture (e.g., shoulders up or chest lifts and expands). Code breaths that seem unusually deep and are obvious. Code yawns (and note this). Do NOT code breaths that seem to be part of P's normal respiration.

Does P exhale obviously? This may sound like a sigh, or a hiss, depending on the speed and force of exhalation. Again, code breaths that seem unusually deep and are obvious. Do NOT code breaths that seem to be part of P's normal respiration.

Gestures/Movements
_____ Illustrative/descriptive of words
_____ Adaptive _____
_____ Touch self

Code illustrative/descriptive of words when P uses hands, head, general body, face, or otherwise gesture in a way that helps illustrate what his/her words are saying. Do we understand the statement more fully because of descriptive gestures?

Code adaptive when P seems to be uncomfortable and performs a gesture that seems intended to relieve the discomfort (e.g., scratching, twisting head/neck to relieve tension). Also code gestures/movements that function primarily as a way to relieve nervousness, UNLESS these involve self-touch (in which cases, code as touch self). Please note what behavior you are coding as adaptive. Drinking water is generally considered adaptive.

Does P touch him/herself? Code repetitive self-touching such as twiddling thumbs, playing with hair, stroking hands, rubbing a limb (and note it as repetitive, below). Also code non-repetitive self-touching such as laying a hand on a knee while making a gesture. Do NOT code continuing to keep hands together without movement, or keeping arms folded without movement. Code as adaptive, self-touches that are NOT primarily to relieve nervousness, but ARE primarily adaptive (intended to relieve physical discomfort).

Head :

_____ Nod

_____ Shake head

_____ Other _____

Does P nod their head up and down in a communicative fashion during the episode? Some head nods of this sort function to: signify that P is listening, or that P agrees with the partner, or that P wants to keep the floor while talking, or that P wants to emphasize a particular point. Do NOT code head movements which appear to be the result of stretching or ordinary changes in posture.

Code shake head when P moves head from side to side in a communicative response.

Does P perform some other movement with their head (e.g., pull it back sharply, thrust it forward, cock it to one side …)? Code smaller head and facial movements as illustrative gestures when they help to illustrate a message. Specify what you observe.

_____ Repetitive

Are P's gestures, touch, or head movements (of any type) repeated more than once in the episode? Use an arrow to note which movement(s) is/are being coded as repetitive.

Prosody

_____ Change in pitch (high? low?)

Does P's voice change – either going markedly higher or lower – during this episode? Code changes in overall voice (e.g., voice is markedly higher than normal), as well as definite pitch changes during the conversation. Please circle if the voice goes higher or if it becomes lower, and briefly note the words accompanying such changes.

_____ Stammering/stuttering

Does P repeat words or sounds as if s/he is having a hard time getting them out?

_____ Slower speech rate, unusual pauses

Is there an obvious change in how fast P is talking? Use this code when P slows down the whole rate of their talk for at least a phrase or longer. Use it for talk that becomes slow in order to emphasize a point, etc.

Also use this code for awkward pauses, or extended pauses such as when P is searching for what to say. Do NOT use it for ordinary pauses in talk that seem to reflect P's usual rate.

_____ Quieter voice
Does P talk more quietly than usual? A soft voice is coded here only if it marks a CHANGE from P's normal loudness.

_____ Other
Does P use his/her voice in a way other than those mentioned above, that is different from usual for P?

Other:
Note anything else you feel may be of importance in understanding this episode.

Complete Content Section:

Complete Top Section as shown above.

Content

_____ Accept own responsibility in a problem
Does P verbally acknowledge their own part in the problem being discussed? Does P take responsibility for their role in the problem? Code this when P seems to: (1) understand the problem, (2) see his/her role in the problem (i.e., does not blame spouse for the whole problem), AND (3) be agreeable to helping solve the problem.

_____ Agree with spouse
Does P agree with the partner? This may be shown verbally or with a combination of verbal and nonverbal signals. Do NOT code signals that seem to mean "I am listening." Only code signals that seem to be saying "I agree with you about that." Do NOT code "Yes, but" statements in which the "yes" portion is really only a preface to the disagreement in the "but" statement.

_____ Acknowledgement token/Backchannel
Does P say "uh-huh," or make other noises or nonverbal signals while the spouse is talking, that mean "I'm listening" or "I am tracking the conversation"? Also code head nods that indicate that listening is happening.

_____ Ask new-information question
Does P ask the spouse a question which seems intended to elicit information that P does not already have? Do NOT code rhetorical questions (in which P already knows the answer).

_____ Change topic
Does P suggest that they change the topic, introduce a new topic, or collaborate eagerly if the spouse proposes a new topic?

_____ Explain something outside of the relationship
Does P explain something objective or fact-oriented? Do NOT code personal explanations of how P feels/is as a person.

_____ Humor (both partners smile or laugh, tone of happiness)
Do BOTH partners smile or laugh or otherwise convey that they think something is funny? Code only humor that has a tone of happiness. Do NOT code humor that has an undercurrent of hurtfulness. Note whether the humor occurred in the episode, in the context clip, or in both.

_____ Meta-talk about relationship
Does P talk about the couple's relationship as an object? Examples include: "I think our marriage is going well." "How do you feel about our relationship?" Code talk that treats the relationship as something "out there," rather than as part of the current interaction.

Language use:
_____ Conclusion ("so," "well," "because" …)
Does P say "so" or otherwise either offer a conclusion or ask the spouse to offer a summation of the point?

_____ Certainty ("always," "never" "it's wrong!" tone)
Does P use words or a tone that express full confidence that what s/he is saying is absolutely correct? Code statements that P delivers as un-questionable. Also code words that are given an extra weight of certainty by the way they are delivered. Do NOT code statements that are "only my own perspective."

_____ Directive ("you should")
Does P tell the spouse what to do? Does P issue a command? Code when the tone is imperative – (you/we/I/they) (have to/must/should) do this.

_____ Feeling words ("I feel," "it's hard," or something similar) related to emotion
Does P express a feeling in words? Do not code "I feel" statements that really mean "I think." Code all statements that verbally state emotions.

_____ List several items
Does P make a listing of three or more items or incidents?

_____ Only my own perspective ("I think" "… to me" …)
Does P offer his/her own perspective while implying that s/he realizes that the spouse may not agree with this perspective? Does P suggest that this is "only my opinion," or may be true only "for me"? Do NOT code BOTH certainty and own perspective.

_____ Tentative language ("maybe," "if," "possible," "might," "like," …)
Does P use that avoid making a statement sound too definite? Does P formulate statements as questions?

_____ "We" language ("us," "our" …)
Does P use words that treat the couple as an entity?

_____ "You know" or "you know what I mean" or similar phrase
Does P say "you know" or a similar phrase suggesting that the spouse already agrees with him/her?

Spouse made negative remark prior to or at beginning of episode Yes No
_____ Person responds to spouse's negative remark with neutral affect

Review the episode, context, or (if necessary) preceding video to determine if the spouse's latest remark (or obvious nonverbal communication)has a negative tone. Circle Yes or No.

If Yes, code how P responds IN THIS EPISODE to the spouse. When the partner's preceding remark has a negative tone or content, does P respond in a neutral (non-negative, non-positive) way? This code can entail simply not retaliating in kind to a barb; P's verbal response and affect may not be positive, but they MUST NOT be negative. Use the following rating scale for how neutral/positive P's response is, in this episode: 4=Strongly agree 3=Agree 2=Neutral 1=Disagree 0=Strongly disagree.

If No, do not code last line.

Appendix F: Transcription Conventions for Exemplar Episodes

Notation used in the transcript includes:
W = Wife
H = Husband

parentheses depict (nonverbal elements) of the interaction
these are noted just ABOVE the line of speech to which they apply
brackets [indicate words that are not part of the episode of changing heart rate]
colons within a word show a prolo:::nging of that sound within the word
periods within parentheses (.) indicate a pause, each period representing about one beat, based on the person's speaking rhythm
equals sign = means that two statements immediately follow each other.
period . indicates a stopping fall in tone
comma , indicates a continuing intonation
question mark ? indicates a rising inflection
underlining indicates a word that is <u>emphasized</u>

This system is in the spirit of the Jefferson notation system (Atkinson & Heritage, 1984/1999; Stamp & Banski, 1992), with the addition of nonverbal notes and heart rates information.

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Vita

Linda Frances Potter was born in Deming, New Mexico in 1961 to E. B. and Nettie M. Potter. After marrying Don Crumley in 1981, Linda Potter Crumley attended several different colleges and universities while enjoying the arrival of Shanna, Travis, and Lindsey Crumley. In addition to the honor of parenthood, Linda holds an Associate of Arts degree from Hartnell College, Salinas, California, Bachelor of Arts in Communication (minor in Chemistry) from Pacific Union College, Angwin, California, and a Master of Arts in Rhetoric and Communication from University of California at Davis, California. Linda's academic publications include a book review in the Southern Journal of Communication, and an article co-authored with Dr. Anita L. Vangelisti in Communication Monographs. The article, "Reactions to messages that hurt: The influence of relational contexts," won the Frank B. Knowler award from the Interpersonal Division of the National Communication Association in 2000. Linda researched at the Gottman lab at UW Seattle, and taught at UC Davis, UT Austin, and American River College of Sacramento, California. She currently teaches at Olympic College Shelton, Washington. She enjoys research, writing, and speaking about communication issues, and coaching people in communication.

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